THE BULLETIN

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1971

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THE BULLETIN

VOLUME 36 NUMBER 6
1971

THIS ISSUE

RAILS OVER THE ROCKIES, William Douglas Warren 6

CHAPTER ACTIVITIES 46

MAIN LINES 51

John W. Maxwell

COVER PHOTO: The *Scenic Limited*, with 4-8-4 No. 1801, is assisted up the Eagle River Canyon by 2-8-8-2 No. 3618. The climb to Tennessee Pass involves 3% grades and, therefore, requires a great deal of tractive effort. This photograph dramatizes the sheer bulk of the Rio Grande's 3600's. On page 6, W. D. Warren has captured three SD 45's on a "hotshot" at the same location. Mineral-rich Leadville limestone crops out just above the highway.

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Rails over the Rockies

William Douglas Warren

I INTRODUCTION

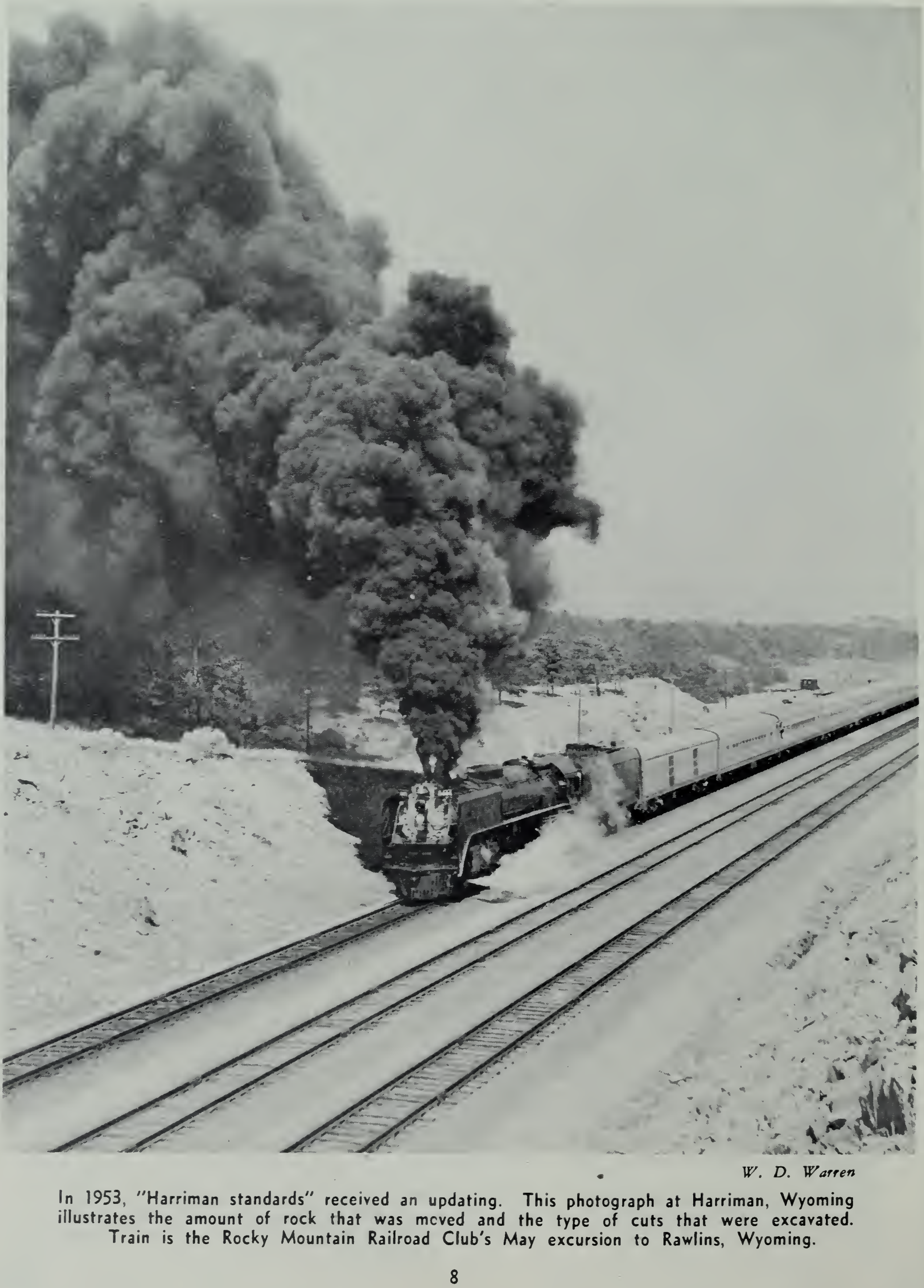
During the past century, the Southern Rocky Mountain Province has experienced the development and operation of what constitutes an almost incredible number of mountain railroad routes. Only the Alps of Central Europe can rival the Southern Rocky Mountains with respect to railroad development. Since the year 1869, eight separate routes have existed for crossing this landform region. In addition to the transcontinental routes, many routes of a more local nature have also existed. Companies such as the Florence and Cripple Creek, Denver, Boulder and Western, and the Crystal River Railroad are examples of some of these local carriers. This article will concentrate on the transcontinental routes, placing emphasis on those routes that have proven their viability by survival.

The area designated by the term "Southern Rocky Mountain Province" is outlined on the map on Pages 28-29. This region has areas of extremely rough topography and of inconsequential relief. The Front Ranges, the Sangre de Cristo, the Sawatch Range, the Park and Gore Ranges and the San Juan Range constitute the major units of rougher topography. The Parks and the San Luis Valley fill the interstices between the major areas of uplift (Fenneman, 1931, p. 94). Readers familiar with this region may notice that ranges such as the San Miguels and the Laramie Mountains have not been specifically mentioned. Actually, the San Miguels are included in the San Juan Mountains, and the Laramie Mountains are included in the Front Ranges. In a mountain region, the spatial, or topographic, viewpoint is very important. However, there has not been a single study that attempts to assess the impact of landforms on the development of railroads in the Rocky Mountains. The existing histories of the various railroads of the Southern Rocky Mountain Province treat the subject chronologically, rather than topographically. In this short article, the impact of the physical geographic factor will be evaluated in very general terms. We will seek to assess how the physical factor influenced the success or failure of permanent transportation routes. In addition, the relationship between transportation routes and urban patterns will be examined briefly.

Railroad Pass Routes of the Southern Rocky Mountain Province

II LANDFORMS

In the West, there is a wide range of landform types. Mountain areas are often laced by "V" shaped stream valleys at the lower elevations such as the Royal Gorge or South Boulder Canyon, while at higher elevations these valleys take on a "U" shaped form. All surfaces of earthen material can be termed as being either transported or residual. In general, the residual surfaces[1] (erosion surfaces) take many forms which are directly related to climate. Climate itself is zoned according to elevation. At the lower elevations (5,000 - 7,000 ft.) the rock platform (pediment) or mesa is a very prominent residual feature. In the middle areas of elevation, the features are often fluvial[2] in origin. Here chemical weathering has been active and the landforms are often the products of chemical weathering. Often, a mantle of soil and decomposed rock dominates the landscape. Instead of having the sharp lines that physical weathering produces in the desert, the landform possesses a rounded form. The end result of fluvial erosion is a surface called peneplain. A final expression of residual landforms are those that relate to glaciation. The cirque basin, the glacial trough and the alb are prominent products of glacial action[3]. The residual landforms are the significant earth items for they form the features that exist on the spines of the continent where the railroad must locate a suitable pass. The theoretical analysis of landforms (geomorphology) and the regional evaluation of the earth's landscape (physiography) are highly specialized subjects. Hopefully, the following table — though overgeneralized — will suffice for providing the reader with some important reference points. Further information can be obtained from textbooks in the field.

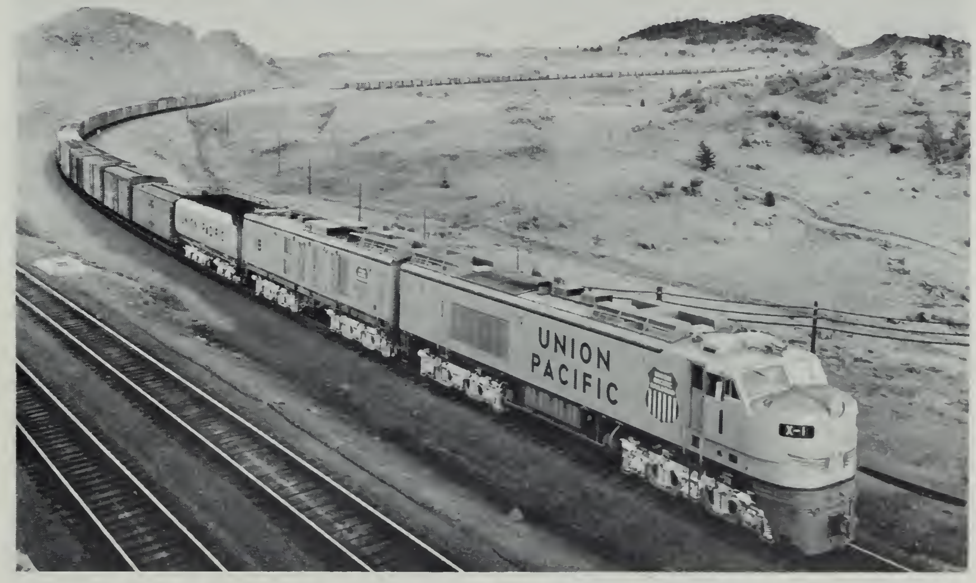


W. D. Warren

In 1953, "Harriman standards" received an updating. This photograph at Harriman, Wyoming illustrates the amount of rock that was moved and the type of cuts that were excavated. Train is the Rocky Mountain Railroad Club's May excursion to Rawlins, Wyoming.

Above, Colorado Railroad Museum
Below, Union Pacific Railroad

Above, Big Boy No. 4004 works up the 1953 cutoff on a .82% grade. These locomotives were the world's heaviest. Below, the 8500 HP turbines defeated the Big Boy. When No. 1 and her sisters arrived on the scene at Sherman in 1958, the Union Pacific's 4-8-8-4's had had their day. This photograph provides a spectacular illustration of the Sherman Surface and the summit area of the Laramie Range. No. 1 is just west of Dale Crossing at the junction between the 1902 line and the 1953 realignment. One of the spectacular cuts constructed by the Union Pacific in 1953 appears on the upper right, and Dale Crossing appears on the horizon on the upper left of the photograph. The reader should observe the prairie-like landscape that exists in this section of Southern Rocky Mountain Province.



III LANDFORM DEVELOPMENT

Table I

ITEM	FLUVIAL	GLACIAL	ARID
Basic Landform	Soil covered valleys (peneplained surfaces), permanent streams often with flood plains	Cirque basins, tarns, troughs and moraines	Rock platforms, plains and playas
Basic Weathering Agent	Chemical action	Physical action	Physical action
Valley Form	"V" Shaped	"U" Shaped	Imperfect "V" Shape

Each of the entries in the table is important. Some landforms that are related to transportation and subsequent deposition have already been mentioned above. Playas such as Great Salt Lake are formed in arid areas by ponding and evaporation of streams, and the deposition of the materials that the stream is transporting. In fluvial areas, streams are continually depositing materials in the form of flood plain deposits such as sand bars. Glaciers carry large quantities of rock and other debris. These are often deposited at the glacier's terminal end as cross valley ridges which are called moraines.

In addition to landforms, rock strength is a very critical factor. There are three basic types of rock: igneous, sedimentary and metamorphic. Igneous rock originates from volcanic activity or far below the earth's surface. The most common igneous rock is granite. Sedimentary rocks include sandstone, shale and limestone and these result from sediments or layers of such materials as silt, sand, clay and other such materials. Metamorphic rock results from high temperatures and pressures under ground. These are generally very hard rocks such as marble.

In Colorado and Wyoming, granite has a wide range of strength conditions; however, it does not often create too many problems for railway construction. For example, the Sherman Granite at Sherman Hill, Wyoming, disintegrates readily when compared to the gneiss of the Platte River Canyon or the Royal Gorge. Generally speaking, gneiss was the problem rock for early railroad builders in the Southern Rocky Mountains. In general, this situation causes the following model to have at least some significance.

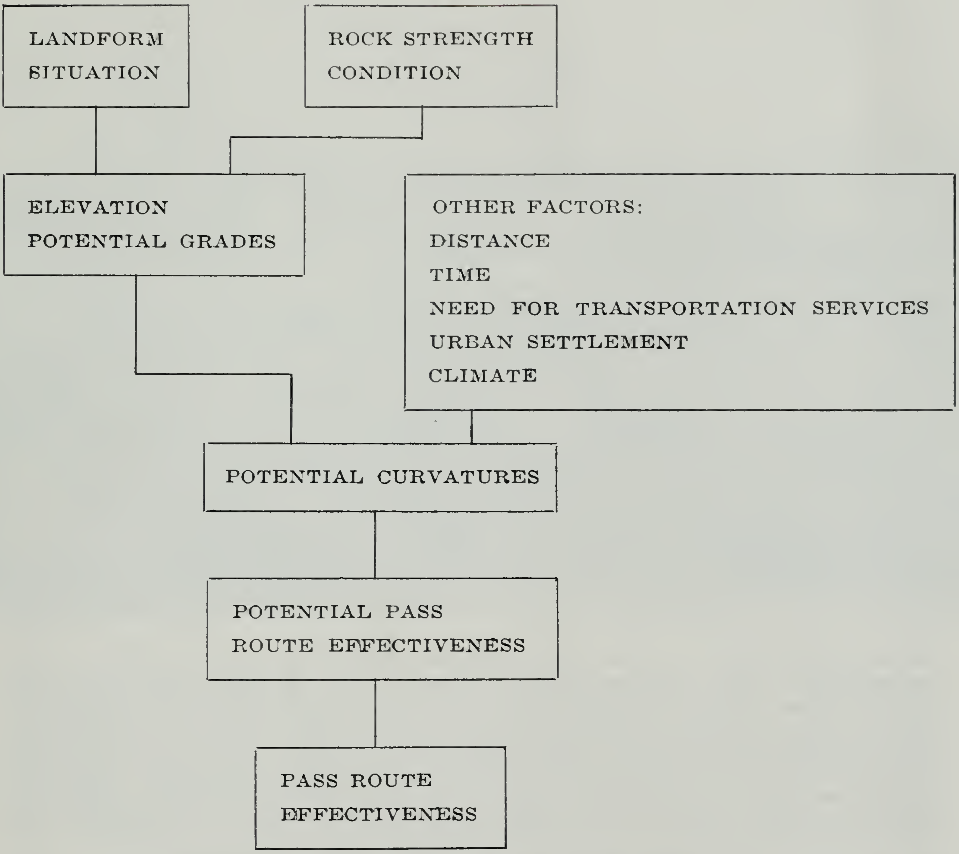
IV MODEL OF PASS SITUATION

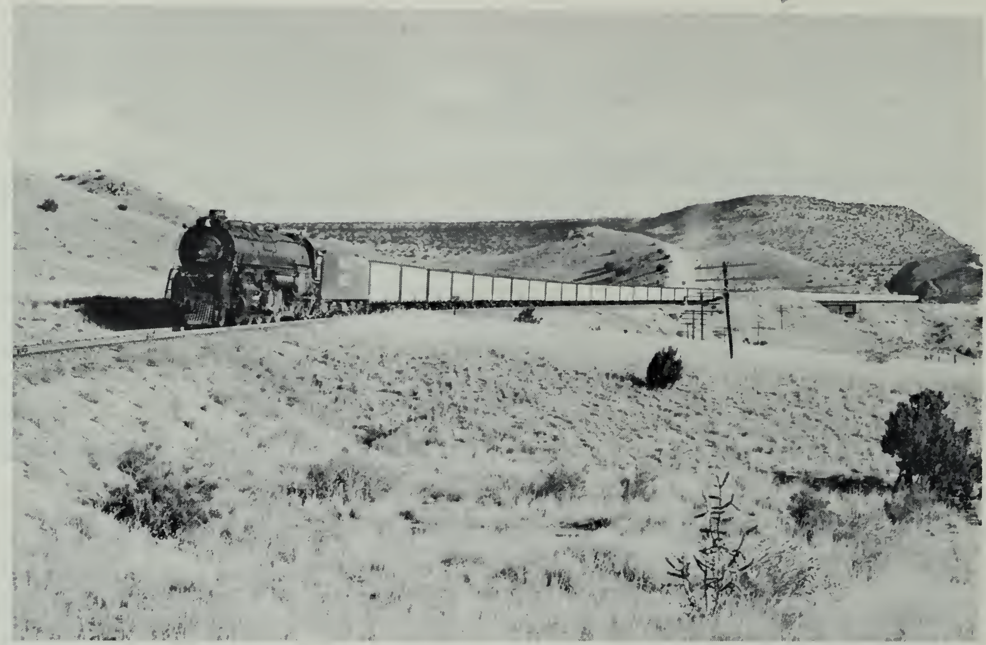
The preceding paragraphs have discussed rock and landform conditions. These largely determine the effectiveness of a pass route. Maximum wheelbase sizes for locomotives are largely a function of the curves that exist along a given route. Curves, as well as gradients, result from landform conditions. However, these characteristics are not always immutable; the maximum eastbound grade for the United States' highest existing railroad pass (Tennessee Pass, elevation 10,212 ft.) is only 1.52%. The "other factors" affect the operation of the model. "Time" and "need for transportation services" are very critical. The now-abandoned Marshall Pass was a major transcontinental route in 1885. It has been replaced by a route 25 miles longer.

W. D. Warren

Opposite, April 6, 1968. The *Yampa Valley Mail* makes her final round trip circuit from Denver to Craig, thus ending 64 years of service across the Continental Divide. From 1904 to 1928, the *Yampa Valley* crossed Rollins Pass. Here we see the *Yampa* rounding the portion of the 360-degree curves that is called the "Arena Curve". The ten-car consist included the Intermountain Chapter's cars 96 and *Navajo*. Observe how the pediments of the Great Plains go right up to the Rocky Mountain Front.

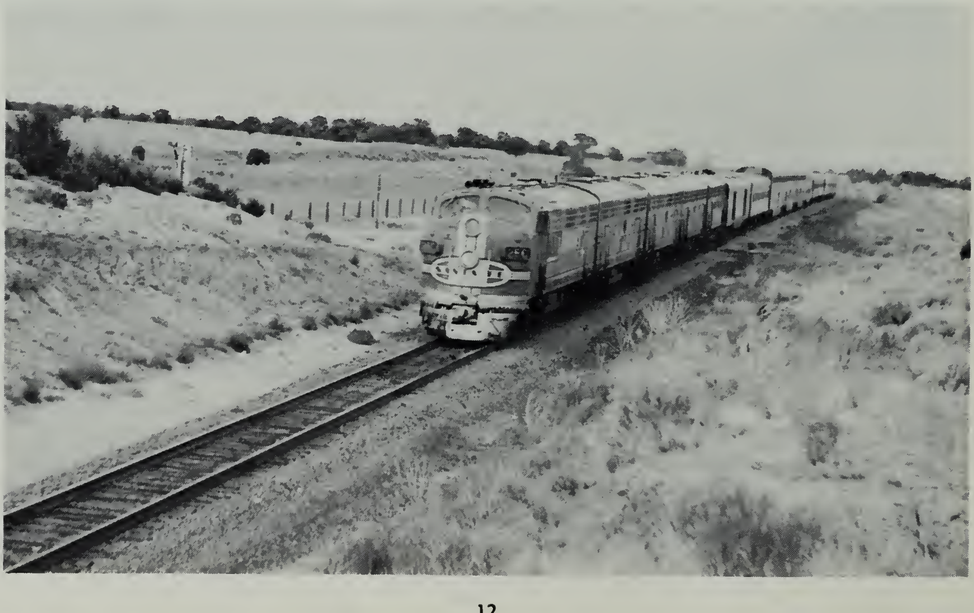
Table II

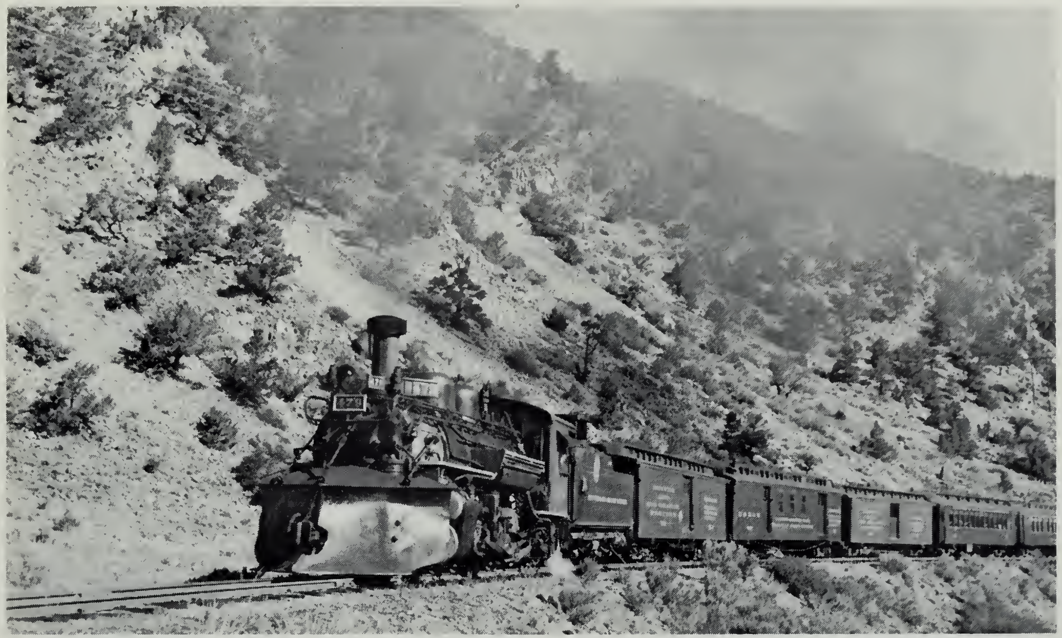

LANDFORM SITUATION
ROCK STRENGTH CONDITION
ELEVATION POTENTIAL GRADES
OTHER FACTORS:
DISTANCE
TIME
NEED FOR TRANSPORTATION SERVICES
URBAN SETTLEMENT
CLIMATE
POTENTIAL CURVATURES
POTENTIAL PASS ROUTE EFFECTIVENESS
PASS ROUTE EFFECTIVENESS



Above, Santa Fe Railway
Below, W. D. Warren

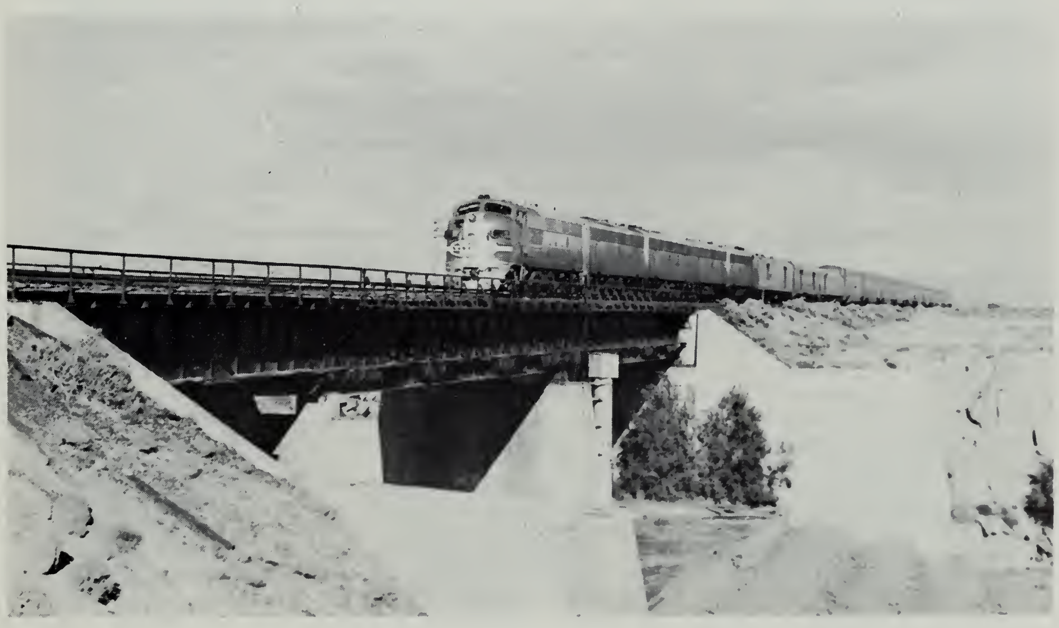
Above, the Abo Pass Route between Belen and Mountainair, N.M. is now the Santa Fe's basic transcontinental route. Abo Pass marks the contact between the Great Plains Province and the Basin-Range Province. 2-10-4 No. 5022 poses at the top of the pass. Notice how the juniper and the cactus of the Basin-Range are commingled with the grasses of the Great Plains. The 2-10-4 must be rated as a superlative adaptation of a locomotive to a power-requirement situation. The 5000's, with their 74-inch drivers, lateral motion compensators, and 93,000 lb. tractive effort were ideal for the 1.25% grades and 2-degree curves that characterize Abo Pass. Below, the semi-"hi-level" *San Francisco Chief* roars across the Continental Divide with three high-level coaches and a full-length dome-lounge car during a pouring rain storm. The Santa Fe's crossing of the Divide is on the Colorado Plateau; observe how flat it is. One could almost say "shades" of Creston and the Union Pacific!





Above, John W. Maxwell
Below, W. D. Warren

Above, the *Shavano* heads up Poncha Canyon with five cars in June, 1940. This route was the original Denver-Grand Junction route via the Royal Gorge and Marshall Pass. The K-28 class "Mike" is no longer on the property, but three of its brothers are busy hauling tourists out of Durango, Colorado. Below, the Santa Fe's *El Capitan* roars across the Rio Puerco bridge in August, 1968, with the Rio Puerco behaving in an angry manner. In traversing the high dry country of the Southwest, acquiring boiler water was often a problem. The local streams are either bone-dry or they are accomplishing mighty feats of erosion. Notice the bridge structure that the Santa Fe has had to construct across the Puerco.



V TIME

The routes which we will examine in this article were developed in the following sequence:

Table III

Time	Route	Pass	Elevation
1868	Union Pacific	Sherman Hill	8,242′
1878	Atchison, Topeka & Santa Fe	Raton Pass	7,588′
1879	Denver, South Park & Pacific	Kenosha Pass	9,991′
1880	Denver & Rio Grande	Royal Gorge	5,660′
1881	Denver & Rio Grande	Cumbres Pass	10,015′
1881	Denver & Rio Grande	Marshall Pass	10,856′
1882	Denver, South Park & Pacific	Alpine Tunnel	11,624′
1882	Denver, South Park & Pacific	Boreas Pass	11,493′
1887	Colorado Midland	Ute Pass — Hayden Divide	9,198′
1887	Colorado Midland	Hagerman Tunnel	11,528′
1887	Denver & Rio Grande	Tennessee Pass	10,212′
1904	Denver, Northwestern and Pacific	Rollins Pass	11,680′
1904	Union Pacific	Sherman Hill Relocation	8,013′
1928	Denver and Salt Lake	Moffat Tunnel	9,239′
1934	Denver and Salt Lake	Dotsero Cutoff	NA
1953	Union Pacific	Second Sherman Hill Relocation	7,876′

Table III does not list every line change that occurred on these routes. These will be considered in the following portion of this article. It can be observed that the Union Pacific was the original operator in the Southern Rocky Mountains. This route received several major realignments in 1904 and 1953. The Atchison, Topeka and Santa Fe and the Denver and Rio Grande were the next companies to attempt to construct railroads into this region. Both railroads sought two routes. Unfortunately, both were seeking the same routes (the Raton Pass-Glorieta Pass Route and the Royal Gorge Route). The contest for these routes covered the period from 1878 to 1880. In 1878, the AT&SF acquired the Raton Pass Route. Eventually, the D&RG acquired sole possession of the Royal Gorge in 1880. The D&RG then commenced to develop three separate transcontinental routes (Marshall Pass, La Veta-Cumbres Pass and Tennessee Pass). Meanwhile, the Denver, South Park and Pacific was constructing across Kenosha Pass in 1878. In 1882, the DSP&P crossed the Continental Divide by way of Alpine Tunnel. In 1884, the DSP&P opened its Leadville Line. In the middle 1880's, the Colorado Midland began pushing standard gauge track into the Arkansas River and Grand River (Colorado River) portions of the Southern Rockies, which had been the exclusive province of narrow gauge operations (3′0″ gauge). The Alpine Pass Route, the Marshall Pass Route, the Tennessee Pass Route and the LaVeta-Cumbres Pass Route were now faced with the specter of either adopting standard gauge or withdrawing from the potential market for handling transcontinental traffic. The Tennessee Pass-Royal Gorge Route has succeeded in achieving this conversion. All of the other above mentioned transcontinental routes or segments thereof have failed except for the Cumbres Pass Route, which has now been partially abandoned. Eight routes were originally conceived of as transcontinental links or had possibilities of becoming parts of transcontinental systems. Today, four of these routes are operational (Sherman Hill, Moffat Tunnel, Royal Gorge-Tennessee Pass and Raton Pass). Of these, Sherman Hill is an extremely viable route. The original conception by David Moffat of a Denver to Salt Lake City Route has undergone a complete modification with the development of the Moffat Tunnel and the Dotsero Cutoff. Today, this busy route is a vital part of the Denver and Rio Grande Western and forms the fourth route. In addition to these four routes, the La Veta Pass-Cumbres Pass-Lizard Head Pass Route is still functioning as far as Chama.

VI PRESENT RAILROAD PASS ROUTES

In this section the physical nature of the surviving pass routes will be discussed. Many arguments in the earth sciences have resulted from disagreements that pertain to terminology. Photographs have been used to avoid semantic difficulties and to help the layman gain a better understanding of the author's viewpoint. The routes will be considered in terms of a number of items that comprise the physical situation of the passes that must be crossed. Landform situation and rock types will be examined first.[4]

The elevation of the pass route and the number of passes that must be crossed to get over the Southern Rocky Mountain Province will be considered; for example, the Denver, South Park and Pacific had to cross three passes (Kenosha, Trout Creek and Altman) in order to traverse the Southern Rocky Mountain Province. On the other hand, the Moffat Tunnel Route has only the one climb to the Moffat Tunnel. Railroads that climbed more than once in traversing the Southern Rocky Mountain Province usually presented operating ratios that were as ragged as their profiles.

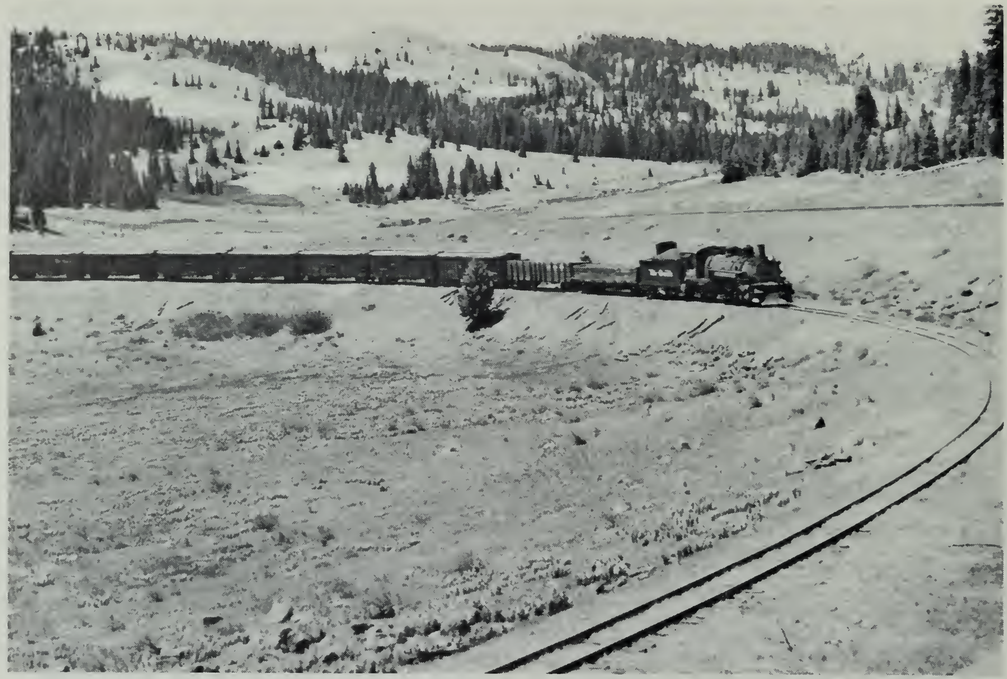
The Union Pacific

The first route to be constructed across the Southern Rocky Mountain Province was the Union Pacific. This route traverses the Laramie Range of the Front Ranges between Cheyenne and Laramie, Wyoming. While crossing the Front Ranges, which at this point are approximately 40 miles wide, the Union Pacific achieves the highest elevation along its main lines. The Laramie Range consists of two very distinct elements where it is crossed by the Union Pacific. On both the Great Plains side and the Wyoming basin side of the Front Range there are sedimentary rocks, which underlie a plateau-like surface that provides easy access to the upland area known as the "Sherman Surface". The relatively flat surface on the east side of the Sherman upland that extends west from Cheyenne is called the "gangplank". The Union Pacific followed Clear Creek and Lone Tree Creek in ascending the gangplank. Instead of the steep-walled chasm-like canyons that one finds in Colorado, these creeks flow in gentle, open valleys and possess very slight gradients. At Granite, Wyoming, it is possible to observe a red bluff to the north of the railroad. At this point, the route enters the second increment that comprises the Laramie Range. The red colored rock is the Sherman Granite. The landforms that have developed at this location consist of large expansive rock platforms of very low relief. The photo of the Union Pacific's turbine No. 1 on page 9 provides an excellent illustration of the lack of mountainous conditions on the Sherman upland, where the Union Pacific crosses the Southern Rocky Mountain Province. No. 1 is approximately 7,876 ft. above sea level and it is at the junction of the main line and the 1953 realignment. This is the high point for trains that follow the Dale Creek Cutoff route. The line that crosses the range at Sherman Station can be seen on the horizon above the turbine's tender. The picture of the No. 4004 provides a good example of the Sherman Granite. The Union Pacific should consider itself very fortunate for having its route through this heavily weathered rock. The human hand is the only tool that is needed in order to break off "hand specimens" of this badly decomposed rock unit. Consequently, the Union Pacific has very few tunnels on its main-line between Ogden and Omaha. The maximum uphill gradient is 0.82% and the maximum curvature is less than 8° between Cheyenne and Laramie. The original line was considerably steeper, and it was poorly constructed. Although this route achieved a maximum elevation of 8,242 ft. at Sherman Summit, the route cannot be regarded as being a mountain railroad. When one examines the countryside around Sherman Hill, he is struck by the similarity of this area to the Great Plains, which are adjacent on the east. It is remarkable that Will Durant and the Ames Brothers were able to collect the "mountain" rate of federal subsidization for the construction of this line. The line that the Ames

D&RGWRR
ROYAL GORGE ROUTE
SCENIC LINE

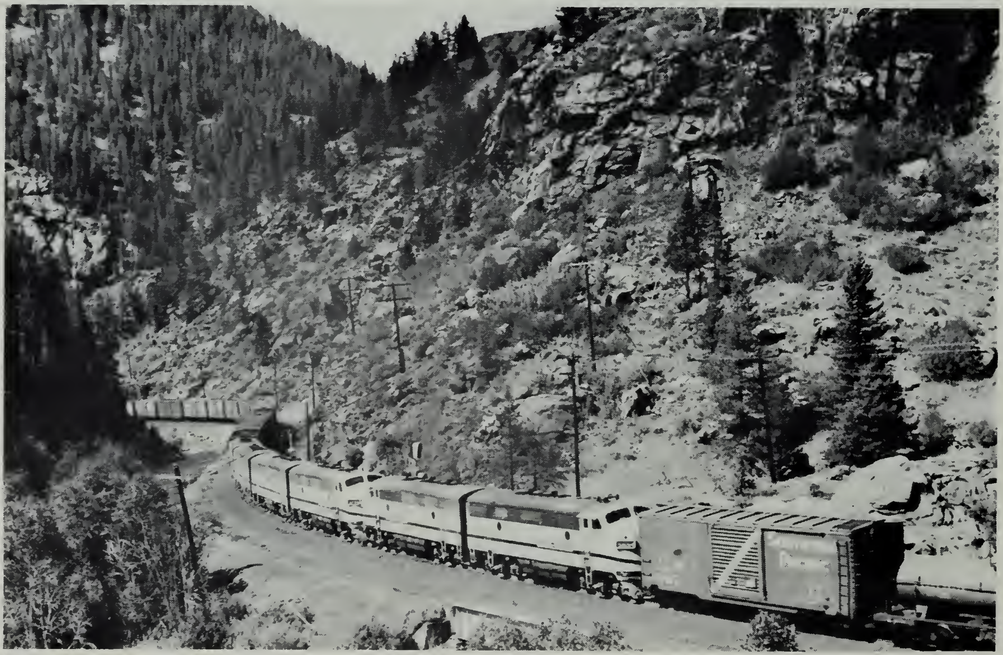
RIO GRANDE
ROYAL GORGE
MOFFAT TUNNEL
SCENIC LINE OF THE WORLD

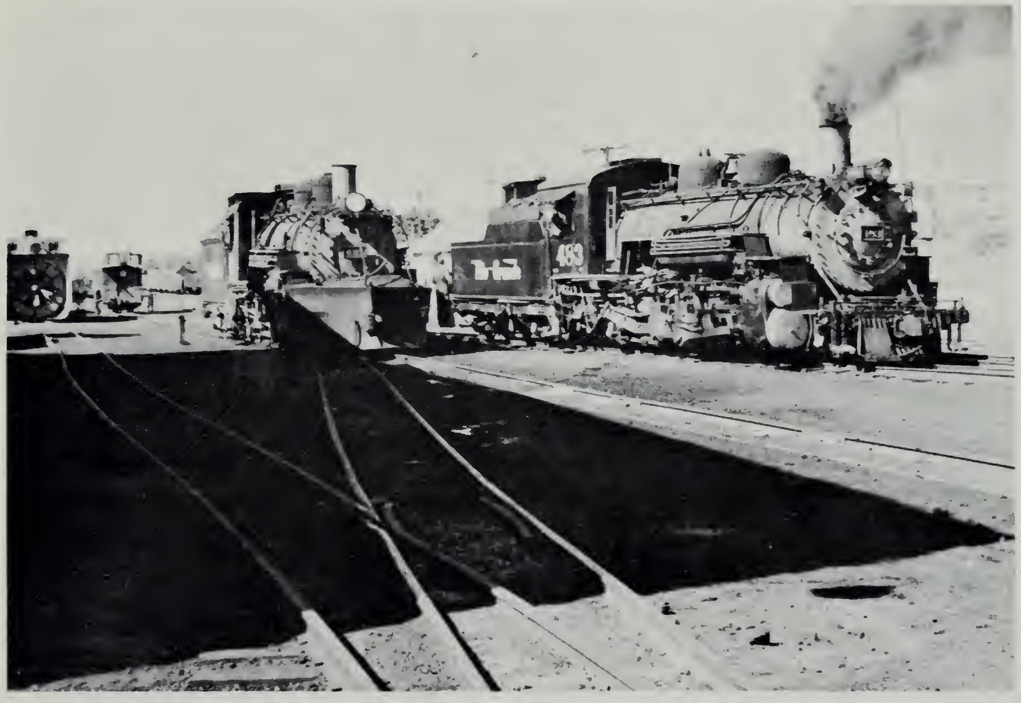
MAIN LINE
Rio Grande
THRU THE ROCKIES



Both, W. D. Warren

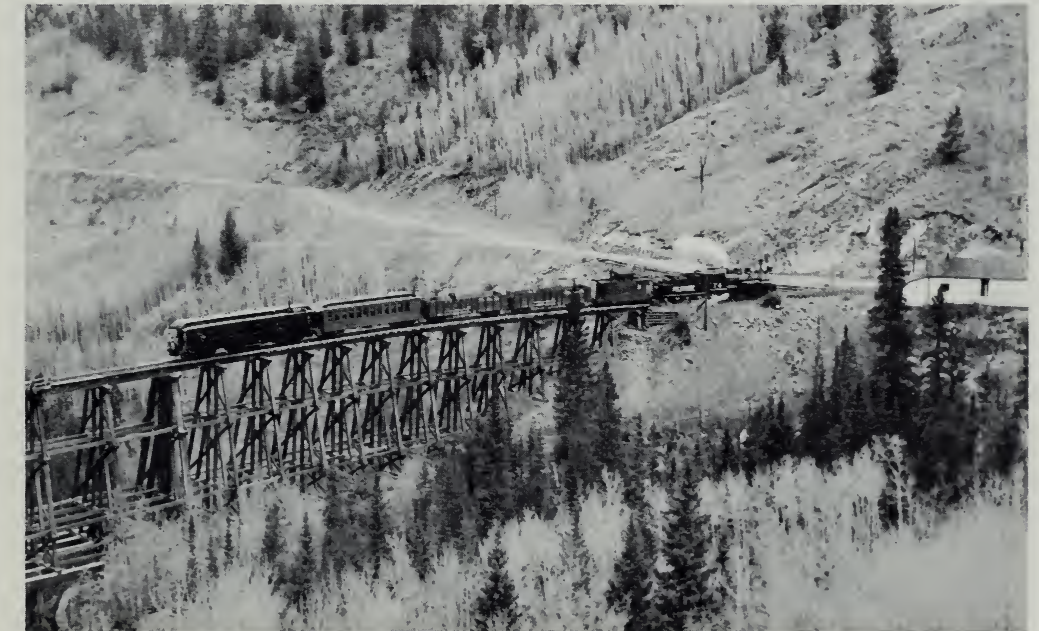
Above, east of Cumbres Pass, grades are rather mild, but the route contains some rather sharp curves. Immediately east of Cumbres, the line circumnavigates Tanglefoot Curve. The author is standing on the right-of-way as No. 493 comes back around at him. Tanglefoot has over 360 degrees of curvature and it is a fine example of an "elevation-gaining device". Below, a mid-train helper of six units assists a Rio Grande freight up the Eagle River Canyon. Except that one of the main tracks has been removed account installation of Centralized Traffic Control; the trees are larger (they have had 27 years to grow) and the smoke is gone.





Above, W. D. Warren
Below, John W. Maxwell

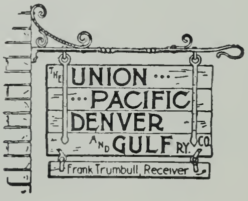
Above, No. 483 backs past No. 493 as they prepare to hoist a train up Cumbres Pass' 4% grades. The place is Chama, N.M. 2-8-2 No. 493 started life in 1902 as a standard gauge 2-8-0 of the C-41 class (No. 1105), with a tractive effort of 40,893 lbs. It would have been scrapped long ago if the conversion to narrow gauge had not occurred. When the 493 and 483 assault Cumbres Pass, the combined tractive effort is 73,000 lbs.; it is a sight to see and a sound to hear. Notice the unused snowplow; Cumbres Pass now shuts down in the wintertime. Below, the Cumbres Pass route achieved Grand Junction via the Rio Grande Southern and Lizard Head Pass. In the vicinity of Ophir, No. 74 leads an excursion in May, 1949.



Brothers built was replaced or reconstructed by the E. H. Harriman administration in the early 1900's. Harriman "standards" effected the straightening of the route, the lowering of the pass by 230 ft., the installation of double track, the acquisition of modern locomotive power and many other improvements. From this point on, the Union Pacific's Omaha, Nebraska - Ogden, Utah segment has been and is one of the nation's busiest railroad routes. In 1953, the Harriman "standards" were revised and updated. The maximum gradient was reduced from 1.52% to 0.82%. Many of the former railroad routes in Colorado contained gradients of 4% along with curvatures of 24° or more. This difference in curvature and grade situation is largely a matter of landforms. The flat upland area that is traversed by the Union Pacific is called the Sherman Surface (Moore, 1960, p. 218). Many arguments are presently being debated regarding the geologic nature of this surface. These arguments are largely oriented to the climate that dominated the situation when this surface developed. (For the author's viewpoint on this matter, please refer back to the discussion of the chart on landform development). The arguments on the subject of formative mechanism do not pertain to this article. The item of significance is the *fact* that the Union Pacific's route crosses a series of rock platforms of very *low relief* in traversing the Southern Rocky Mountains. This landform situation permitted the Union Pacific to develop locomotives of truly prodigious dimensions. For example, the 9000 series 4-12-2's with a rigid wheelbase of over 30 ft. possessed the world's record for rigid wheelbase length for railway equipment. The use of highly efficient equipment, low gradients, minimal curvatures and a very short transcontinental route distance has permitted the Union Pacific to move from bankruptcy in 1893 to one of the nation's most successful railroad companies.

Raton Pass and the Royal Gorge

During the early part of its existence, the Union Pacific-Central Pacific route possessed a monopoly on transcontinental transportation. In 1869, the Atchison, Topeka and Santa Fe began the construction of its route. By 1871, General Palmer had opened the Rio Grande Railroad. Although these railroads were destined to be transcontinental competitors of the Union Pacific, the initial goal of both the Santa Fe and the D&RG was oriented to the North-South freight traffic that moved along the Santa Fe Trail. Two separate routes to Santa Fe, New Mexico, were given very heavy consideration, and by 1886 railroad service was being provided to Santa Fe over both routes by both railroad companies. In 1876 and 1877, the D&RG opened its La Veta Pass route to Alamosa as it built toward Santa Fe in conjunction with the stipulations of its charter (Athern, 1962, p. 162). Although the D&RG reached Santa Fe within ten years of the opening of the route to Alamosa, it will be seen that La Veta Pass is best oriented toward East-West traffic. The important aspect of the opening of La Veta Pass is the fact that it forced the Santa Fe to obtain a pass route for its own operational activities. Additionally, the D&RG had recently adopted a policy of cooperating with the Union Pacific much to the dismay of the Santa Fe.[5] The Santa Fe forces defeated the D&RG forces in the race for Raton Pass by approximately 30 minutes (*Colorado Annual*, 1965, p. 3). Both railroads now possessed a pass route to Santa Fe. However, we will see that these routes that started as North-South trending routes survive today as routes that have a basic orientation towards East-West traffic. This left the Royal Gorge route as the last remaining route that could be easily developed for obtaining access in either a westerly or southwesterly direction from the Great Plains. The United States Supreme Court eventually conveyed the Royal Gorge route to the D&RG on April 21, 1879. During the interim, legal activities were almost secondary to attempted measures of coercion. Forts were constructed, the "deadman's line" was established, and "armies" were hired by both sides; however, the "Royal Gorge War" was almost bloodless. With the completion of these routes, the position of pass routes in the southern portion of the Southern Rocky Mountain Province was completed.


THE UNION PACIFIC DENVER AND GULF RY. CO.
Frank Trumbull, Receiver

Raton Pass

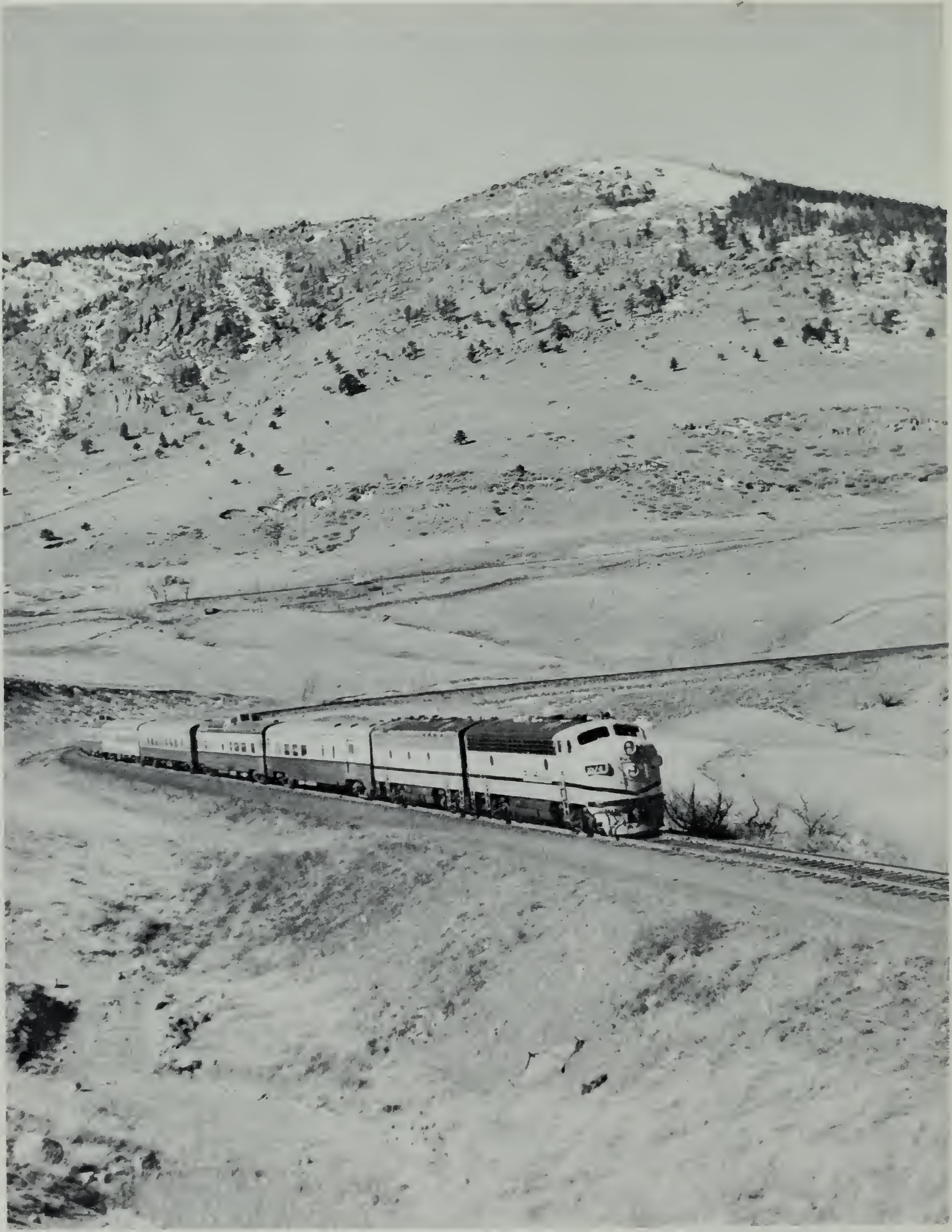
Raton Pass is located on the Great Plains. It is quite unusual to have a pass of this magnitude in an area where one expects to find gentle grades. However, in order to cross Glorieta Pass, Raton Pass must be traversed, and Glorieta Pass is in the Southern Rocky Mountain Province. Glorieta Mesa is part of the Sangre de Cristo Range (Fenneman, 1931, p. 94). Therefore, we have a mountain pass in the Great Plains Province that is higher and contains steeper grades than exist on the mountain pass in the Southern Rocky Mountain Province. Additionally, Raton Pass is essentially a North-South Pass on an East-West railroad route. While it is true that the Santa Fe Trail crossed Raton Pass, this did not set a stipulation that the railroad should follow the same route. The author has been informed that the coal measures of Trinidad, Colorado were a strong factor in the selection of Raton Pass. Additionally, a route bypassing Raton Pass would almost be required to traverse the Oklahoma Territory, which, of course, was devoted exclusively to Indian Reservation uses at this time. Raton Pass presented some formidable obstacles to railway operations. The westbound ruling grade is 3.50% (compared with .82% on the Union Pacific). The maximum curvature is 10°30′. Although this pass situation did not preclude the operation of large locomotives with long wheelbases, it certainly restricted the amount of tonnage that could be hauled by one locomotive. Raton Pass, with an elevation of 7,588 ft., is the high point enroute for the *Super Chief—El Capitan.* Glorieta Pass is only 130 ft. lower with a maximum elevation of 7,455 ft. Curvatures are slightly improved (10° maximum curvature), and the maximum gradients are still very steep (eastward 3.1% and westward 1.8%).

The Santa Fe's crossing of the Continental Divide is a completely different story. The westbound main line crosses the continent's spine at an elevation of 7,250 ft. with a maximum grade of 0.6% and maximum curvatures of less than 2°. The photographs of the *San Francisco Chief* at the Continental Divide and the *Chief* climbing Raton Pass, with three locomotives, demonstrate the differences in the landforms along these two routes. The pass across the Continental Divide is located on the Colorado Plateau between Grants and Gallup, New Mexico. The landforms here are a transitional type between the arid cycle and the fluvial cycle. The plant cover matches the climate and landforms by presenting a scrub forest cover of pinon pine and juniper. The railroad has made a rather deep cut through the soil materials at the divide itself. The sedimentary rocks of the Colorado Plateau did not create any major problems in the construction of the Santa Fe across the Continental Divide.

It has been indicated that Raton Pass and Glorieta Pass are quite difficult from the topographic and landform perspective. At a rather early date, the Santa Fe bypassed the "Pass of the Rat" and Glorieta Pass by way of Abo Pass. Instead of 10° curves, the curves on Abo Pass have a maximum curvature of 2°. Instead of 3.5% grades, the westbound grade is a mere .6%, and the eastbound ruling grade is 1.25%. From this, one can see how the Santa Fe was able to put to very good use locomotives like the 5000 series 2-10-4's with their extremely long wheelbases. Understandably, over 90% of the Santa Fe's transcontinental freight traffic takes the Abo Pass Route.

The Royal Gorge

Initially, the Royal Gorge was developed as a rail route in order to obtain access to the mining district that was booming in the area around Leadville, Colorado. This route became — and still is — a rather important transcontinental railroad route. Most people probably do not think of the Royal Gorge as a pass. The Royal Gorge just happens to be the point where the Arkansas River traverses the structure of the Front Ranges. In a most accommodating manner, the river has provided a water level route from Pueblo all the way to Tennessee Pass. The maximum gradient is only 1.51% as the line ascends the eastern side of the Rocky Mountains. Considering the very high summit level (10,212 ft.) of the Tennessee Pass, this is a very remarkable ruling grade. Today, Tennessee Pass is the highest railroad pass in the United States. Very few curves exist on this line that exceed 10°. Naturally, one finds the sharpest curve on the Royal Gorge-Tennessee Pass Route in the Gorge itself. A very sharp 12°48′ curve exists within the Gorge. Here, the construction crews were forced to build the route where the canyon forms an almost perfect fluvial "V", and the rock is gneiss, which is extremely hard. In one place there wasn't any room for a road bed. The Atchison, Topeka and Santa Fe had an ingenious scheme for coping with this problem. Engineers literally hung a bridge between the walls of the canyon (the "Hanging Bridge," not to be confused with the "Suspension Bridge"). Both bridges appear in the photograph of the *Royal Gorge.* The



W. D. Warren

Denver's first standard gauge transcontinental train negotiates the 360-degree curves near Arena (now Rocky), Colo. Usually, the *Yampa Valley Mail* was two cars long, but on this Saturday morning, three cars of skiers, including a canary-yellow Union Pacific coach, are being taken to Winter Park's fine white slopes. The "westbound" *Yampa Valley* is headed due east into the morning sun. Notice the upper and lower level of the track. Above the combine appears the CTC paraphernalia at the east switch of Clay siding.

Hanging Bridge appears behind and to the right of the *Royal Gorge's* last passenger car. As of July 8, 1967, the *Royal Gorge* was discontinued. Today, the Canyon witnesses only the passage of freight trains.

At one time, the Royal Gorge route represented three routes. Until 1955, it was possible to ship through the Gorge to Salida, and then either across Poncha Pass to Alamosa, Marshall Pass to Grand Junction or Tennessee Pass also to Grand Junction. Today's main line was merely a spur that divided at Malta, Colorado, with one branch crossing the Continental Divide at Tennessee Pass, and then going a few miles further to Red Cliff, Colorado. The other branch crossed the Continental Divide by way of Fremont Pass (elevation 11,316 ft.) and led to Dillon, Colorado, on the Blue River. The main line from Salt Lake City to Pueblo and Denver crossed the Continental Divide at Marshall Pass (elevation 10,856 ft.). This route turned south at Salida, coinciding with the route to Alamosa. At Mears Junction, the two routes divided. Until the Depression, a passenger could ride from Denver south and west by way of Royal Gorge, then south from Salida across Poncha Pass to Alamosa. From Alamosa, he could take the "Chili" line down the valley of the Rio Grande to Santa Fe, or he could take the route west across the San Juans by way of Cumbres Pass and Lizard Head Pass to Grand Junction. All of the above mentioned lines have been abandoned except for the Montrose-Grand Junction segment of the Marshall Pass Route and the Antonito-Chama segment of the Poncha Pass, Cumbres Pass and Lizard Head Pass Route. [See NRHS *Bulletin* Volume 35, No. 4, p. 16 (1970)]

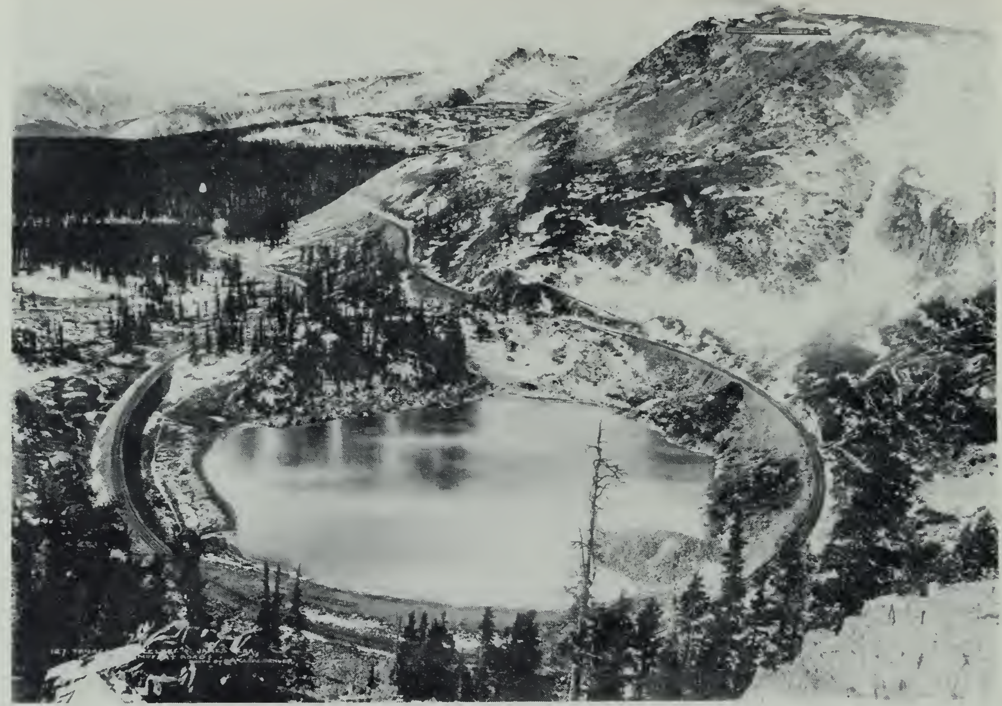
In 1887, the service area of the branch line to Red Cliff was challenged by the Colorado Midland. Hurriedly, the D&RG built a line into Glenwood Springs and Aspen. With the coming of the "standard gauge" Colorado Midland, the "narrow gauge" D&RG was in severe trouble. Following the construction of the Colorado Midland, the connections to Salt Lake City were standard gauged. The successors to the Palmer administration on the D&RG were forced to admit that the General's proviso against the construction of standard gauge railroads in the Southern Rocky Mountain Province was not always 100% correct. In 1890, both the Royal Gorge and Tennessee Pass were opened to standard gauge operation. Narrow gauge operations were maintained on both routes for many years. However, this meant the end for Marshall Pass as a transcontinental route. This route did manage to survive as a local feeder line until 1955. The completion of the Tennessee Pass Route offered an alternative that was inferior inasmuch as it was 25 miles longer than the original route. However, the Tennessee Pass Route contained maximum grades of only 1.51% westbound and 3% eastbound. Curvatures were no greater than 10° at Tennessee Pass (several 12° curves exist in the Royal Gorge, Glenwood Canyon and in the Eagle River Canyon), but Marshall Pass had curvatures that were over 24°. Therefore, power requirements were very high on the steeper route, but locomotive size was strictly controlled by wheelbase length, which in turn was severely restricted by the above mentioned 24° curves.

Table IV shows the relationship between track gauge and locomotive use.

Table IV

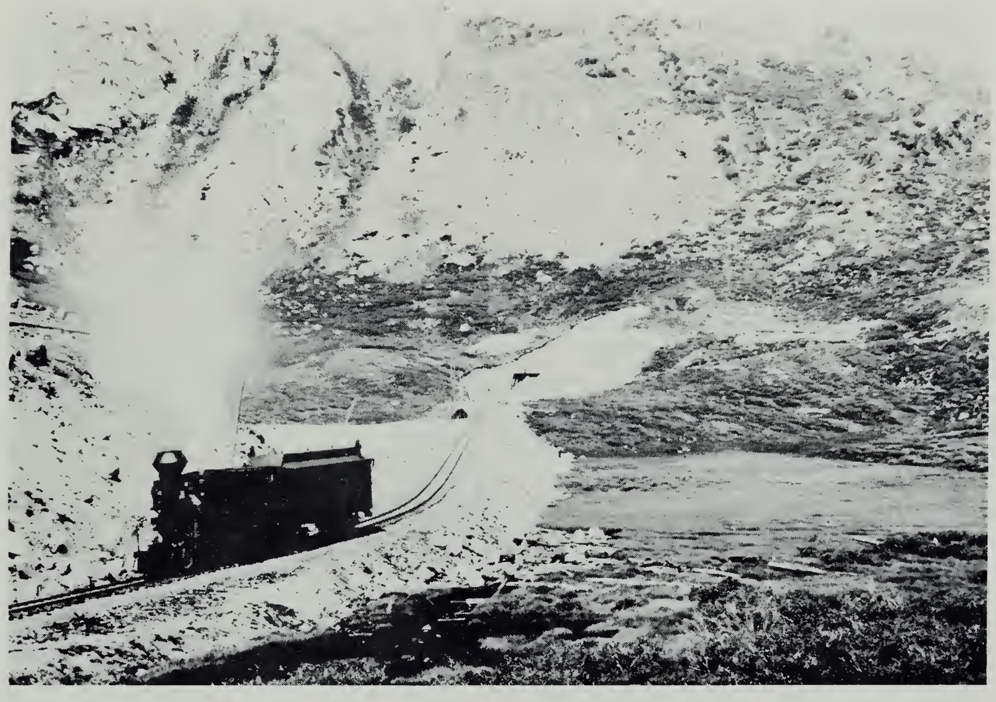
Year	Gauge	Class	Type	Tractive Effort
1890	Narrow	C-19	2-8-0	18,947 lb.
1890	Standard	C-26	2-8-0	25,600 lb.
1910	Narrow	K-27	2-8-2	27,000 lb.
1910	Standard	L-62	2-6-6-2	62,026 lb.
1927	Narrow	K-36	2-8-2	36,200 lb.
1927	Standard	L-131	2-8-8-2	131,800 lb.

Table IV demonstrates what happened to Marshall Pass. As locomotive technology progressed to larger and more powerful locomotive types, the narrow gauged Marshall Pass Route with its sharp curves was not able to take advantage of the larger locomotives because of their lengthened wheelbases. Today, the Royal Gorge-Tennessee Pass freight route is a fairly busy route. Two through freight trains from Pueblo to Salt Lake City are operated each day.



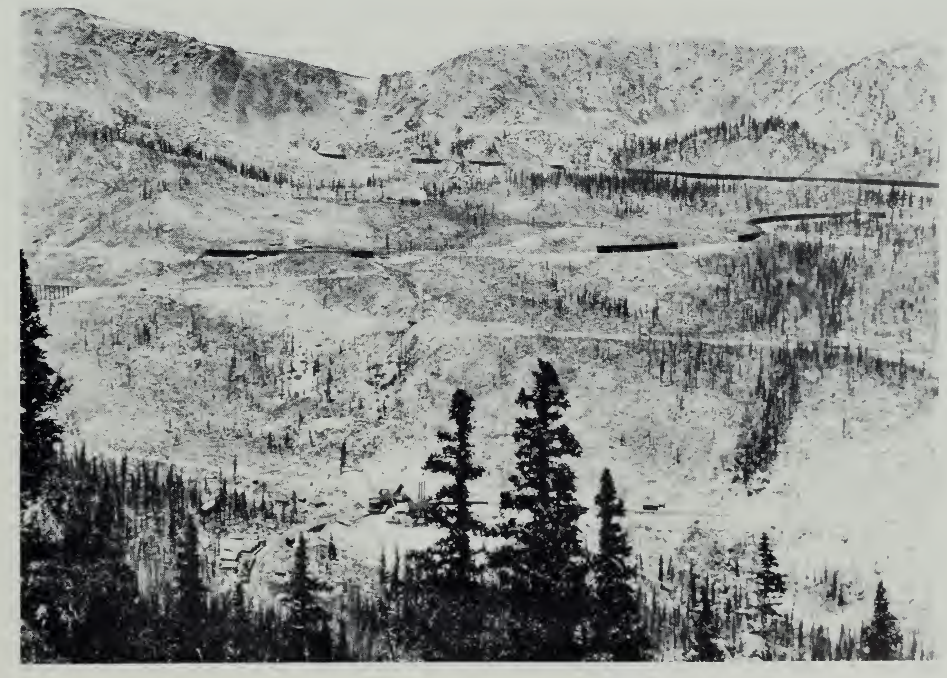
Both, L. C. McClure, Courtesy Denver Public Library, Western Collection

Above, in crossing Rollins Pass, the Moffat Road climbed a cirque headwall in order to attain the Flat Top Peneplain. The train is apparently emerging from the Needles Eye Tunnel, above Yankee Doodle Lake. The flat surface above the train marks the intercept between the cirque headwall and the Flat Top Peneplain. The spoil in Yankee Doodle Lake represents an early attempt at tunneling. Below, the purpose of climbing the cirque headwall was to attain the Flat Top Peneplain. An early version of the *Yampa Valley* crosses the remnant surface in this vintage photograph. Construction was easy on this surface. The train appears to be backing; this illusion is a testimony to the fierce winds that are encountered on Rollins Pass.



Both, W. H. Jackson, Courtesy Denver Public Library, Western Collection

Above, in reaching Altman Pass, John Evans' Denver, South Park and Pacific climbed a glacial valley into a cirque basin. The tunnel pierces the headwall. The Mason "bogey" is immediately east of Alpine station. Below, the Hagerman Tunnel route also involved ascending a glacial trough and cirque headwall. The activity to the right of Busk station indicates the east portal of the Busk-Ivanhoe Tunnel. The lower tunnel removed the chore of ascending the headwall.



On almost every day, there is an extra section of one train, and often there are two sections of each train. Thus, from 275 to 400 freight cars per day move through the Royal Gorge and across Tennessee Pass. This route is a single track route with C.T.C. (Centralized Traffic Control) and it must be classified as a heavy duty main line. It is reasonable to expect that in the future, this route will continue to bear a significant amount of the nation's transcontinental freight traffic.

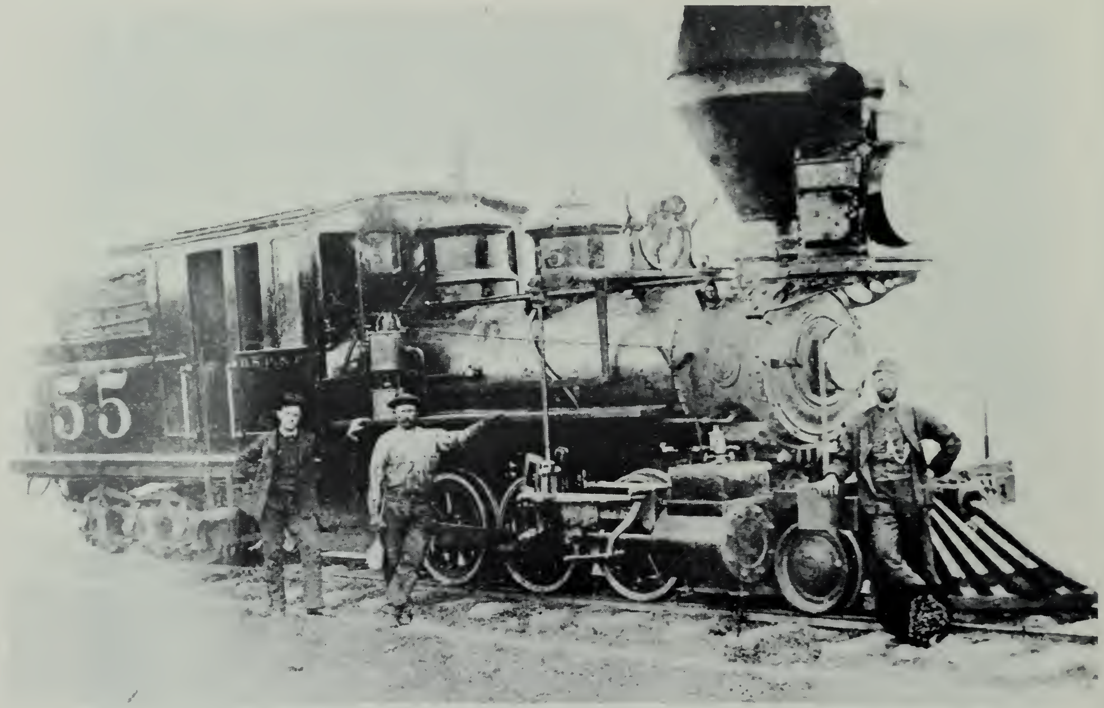
The Moffat Route

In 1903, David Moffat commenced the construction of a railroad west from Denver across the Front and Gore Ranges to the White River Plateau and then into the Yampa Valley. Moffat's goal was to provide Denver with a mainline route to the West coast of the United States via Salt Lake City. Constructing west from Denver, Moffat wisely avoided building his route up the bottom of one of the stream canyons located immediately west of Denver. Instead, Moffat used the Rocky Flats pediment (Scott, 1960, p. 210) and the pre-Rocky Flats pediment as stair steps. The photograph shows the eastbound *California Zephyr* descending westward from the pre-Rocky Flats pediment around the Arena Curve into one of the tributary valleys of Ralston Creek. Once the rock platforms (pediments) were scaled, the westbound railroad followed the contour almost due north for three miles, and then turned into the Canyon of South Boulder Creek, almost 1,000 ft. above the canyon floor. Like Platte Canyon and Clear Creek Canyon, South Boulder Canyon has a very steep gradient, but the Moffat route was able to maintain a 2% maximum grade all the way to Tolland because it avoided the canyon floor near the border of the Southern Rocky Mountain Province. Above Pine Cliff, the Canyon is less steep and it possesses a more open fluvial valley.[6] Just below Tolland, the canyon opens out into a very broad "U" shaped valley (see photo of the *California Zephyr* east of East Portal). Here, the railroad enters the glaciated portion of South Boulder Creek. This is a flat bottomed glacial trough. The construction of the railroad was an easy task within the trough. But all glacial troughs have vertical or near vertical walls, and the trough itself originates in a very steep-walled collecting basin that is called "a cirque basin". Therefore, one must either tunnel or climb the cirque headwall. David Moffat wanted to tunnel, but lack of funds forced him to climb the cirque headwall. Moffat's engineers constructed the "looped" switchbacks above Tolland. This carried the route from the South Boulder Creek Trough into the drainage of Middle Boulder Creek. The route then circumnavigated Yankee Doodle Lake (a tarn or cirque basin lake), and then climbed up the cirque headwall and re-emerged through Needles Eye Tunnel 500 ft. above Yankee Doodle Lake (see photo of Yankee Doodle Lake). Harold Boner has carefully detailed the history of the construction of this route (Boner, 1962). When one attains the crest of the Front Ranges at Rollins Pass, he finds an almost incredibly flat surface. Some geologists call this the Flat Top Peneplain. The term Flat Top is most appropriate. Here again, Moffat's task of construction was easy. However, the Flat Top Surface[7] has an elevation that exceeds 11,600 feet, and is therefore above tree line. If there is a maxim in Colorado railroading, it is "stay down in the trees". A forest cover provides a natural snow fence or wind break. By violating this maxim, Moffat incurred the ruinous expense of continuously operating snow removal equipment for eight months of the year. Two miles of snow sheds were constructed, but the climb up the cirque headwall was left unprotected. From the Flat Top Surface, the railroad follows Ranch Creek down to the Frazer River and Middle Park. Middle Park is the Front Ranges' western slope counterpart of the relatively smooth surface that exists on the east slope in the vicinity of Rollinsville. Some geologists consider both of these "erosion surfaces" to be counterparts to the Sherman Surface that was identified as being an important element in the Union Pacific's route across the Front Ranges. From Middle Park, the Moffat Route descends down the Colorado River drainage through Byers Canyon and Gore Canyon. Originally, Moffat intended to cross the divide between the Colorado River and the Yampa River and then head west by way of the Yampa River Valley.

Moffat lived to see his railroad reach Steamboat Springs on the Yampa River. In order to climb the arid landforms of the lower elevations (Denver to Plainview) and the fluvial landforms of the middle section, Moffat's engineers had to drill 30 tunnels in less than forty miles. Moffat needed one more very expensive tunnel, but his competitors blocked the financing of this development. They clearly understood what such a development portended for the nation's pattern of transcontinental freight routes. The publicly financed Moffat Tunnel finally was constructed in 1928. When the Dotsero Cutoff was completed in 1934, Denver finally acquired a direct route to the West Coast. Today, this is the second busiest railroad route in the Southern Rocky Mountain Province. The Moffat Tunnel sees an average of from 16 to 18 trains per day. The portion of the Moffat route from Bond (Orestod) to Craig is now only a branch. The D&RG clearly read the writing on the wall and obtained control of the Denver and Salt Lake Railroad, (successor company to Moffat's Denver, Northwestern and Pacific). The largest steam locomotive to operate over the Moffat route was the massive D&RG L-132 class mallet. Once the hiatus over Rollins Pass was eliminated, the route became part of a transcontinental system. Its potential as a pass route was demonstrated by its capacity to accommodate some of the world's largest and most powerful locomotives. It is true that 2% grades do affect operating ratios adversely. Also, the 12°48′ and 12°46′ curves in South Boulder and Gore Canyons impose 25 mph speed restrictions. However, some of the D&RGW manifest freights cover the 565 miles from North Yard in Denver to Roper Yard in Salt Lake City in just over 13 hours. That is a terminal-to-terminal average of almost 44 mph, considerably faster than that of most flatland freight train operations.

Cumbres Pass

We have mentioned that Alamosa could be reached either by La Veta Pass or Poncha Pass. Today, the D&RGW still operates daily freight service across La Veta Pass from Pueblo to Alamosa by way of Walsenburg. From Alamosa, the Cumbres Pass line follows the Rio Grande Valley south to Antonito. At Antonito, the line turns westward and begins the 50-mile climb to the summit of Cumbres Pass. The grades on the east side of the Pass are relatively slight with a maximum grade of only 1.4%. Maximum curvatures are 20°. There is no great problem presented by the San Juan Section of the Southern Rocky Mountain Province. However, the Rio Chama has cut a very deep chasm into this landform region of volcanic materials. Furthermore, in the vicinity of Windy Point, it appears that the valley walls have been oversteeped by glacial erosion (see photograph of Coxo's Crossing taken at Windy Point). The descent from Cumbres Pass to Chama, New Mexico, involves 14 miles of 4% grade. Ten miles west of Chama, New Mexico, the Continental Divide is traversed on very mild topography. At Durango, the first impulse of the railroad builders was to establish a route north through Silverton and then over Red Mountain Pass to Grand Junction. In 1882, the rails reached Silverton, but Red Mountain Pass with its 11,018-foot summit was never used as a route. Eventually, a route to Grand Junction and points west was opened by Otto Mears. Mears, the celebrated wagonmaster of the San Juans, took his route west to Mancos, up the Dolores River across Lizard Head Pass, and then down the San Miguel Valley via Ophir. After crossing Dallas Divide, this route descended the Uncompahgre Valley through Ridgway continuing on down to Grand Junction. However, neither of these routes north from Durango offered any long-term prospects to the Cumbres Pass Route. The Silverton Route and the Lizard Head Pass route were far too circuitous. The third line out of Durango was the branch to Farmington. Durango sits almost astride the boundary between the Colorado Plateau and the San Juan Section of the Southern Rocky Mountain Province. The Farmington branch descends the River of Lost Souls (Rio de Los Animas Perdidos) across the Colorado Plateau to the San Juan Valley near Farmington. Originally, this route was constructed as a standard-gauge railroad in 1905; it was converted to narrow gauge in 1923. The entire problem is related to the fact that Mears and his predecessors were seeking only the profits of a booming regional mining economy, instead of attempting to develop a viable transcontinental railroad. Approximately 100 miles south of Farmington is Gallup, New Mexico, and the AT&SF's Chicago-to-Los Angeles main line. This route was the only opportunity for a future that Cumbres Pass ever had. The construction across the Colorado Plateau to Gallup would have been a very easy task. A bond issue had been suggested for a tunnel through Cumbres Pass that would reduce some of the 4% climb. If these two projects had been accomplished, the shortest route from Denver to Los Angeles and the Pacific Southwest would have been by way of Cumbres Pass and Durango. Historians often point out accomplishments that are directly attributable to a foresighted individual, for example, Moffat's vision of a direct route west from Denver. The Cumbres Pass-Gallup Route is an example of a potential that did *not* develop, because a "man of vision" did not appear on the scene.



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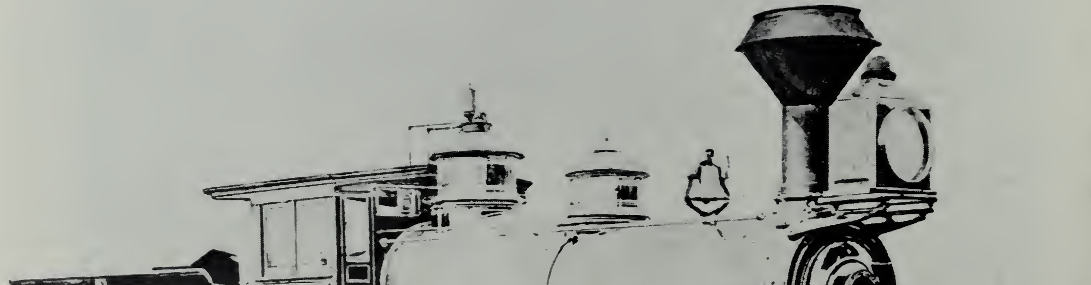
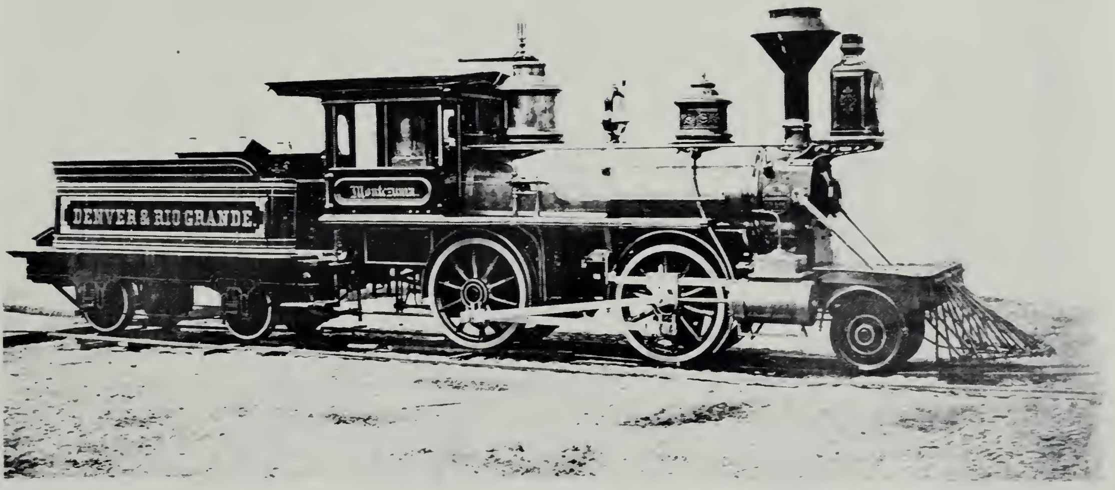
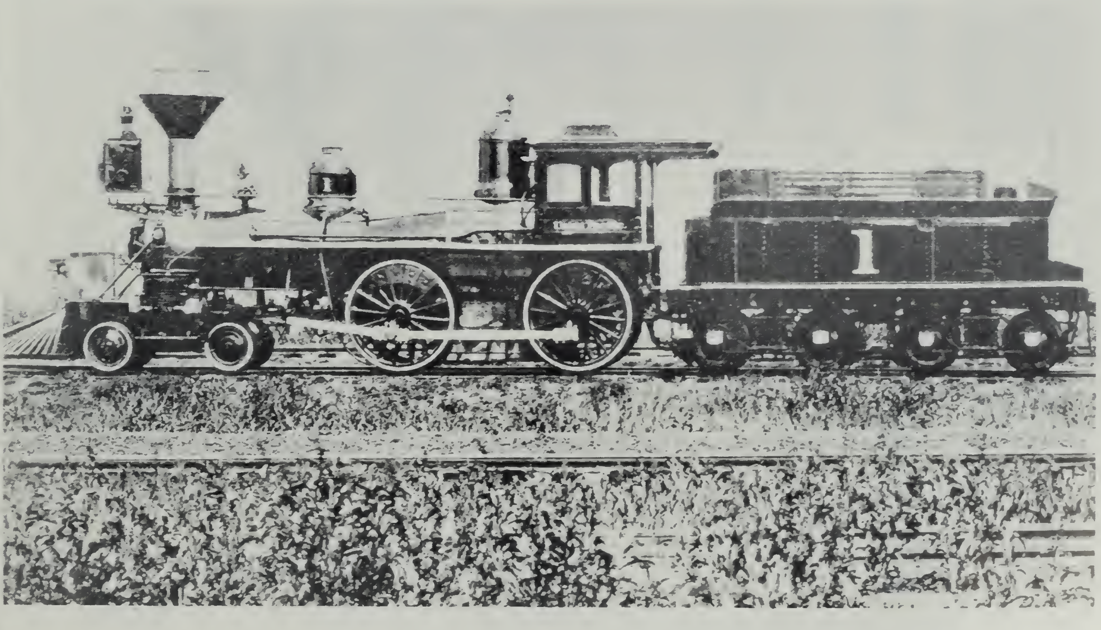


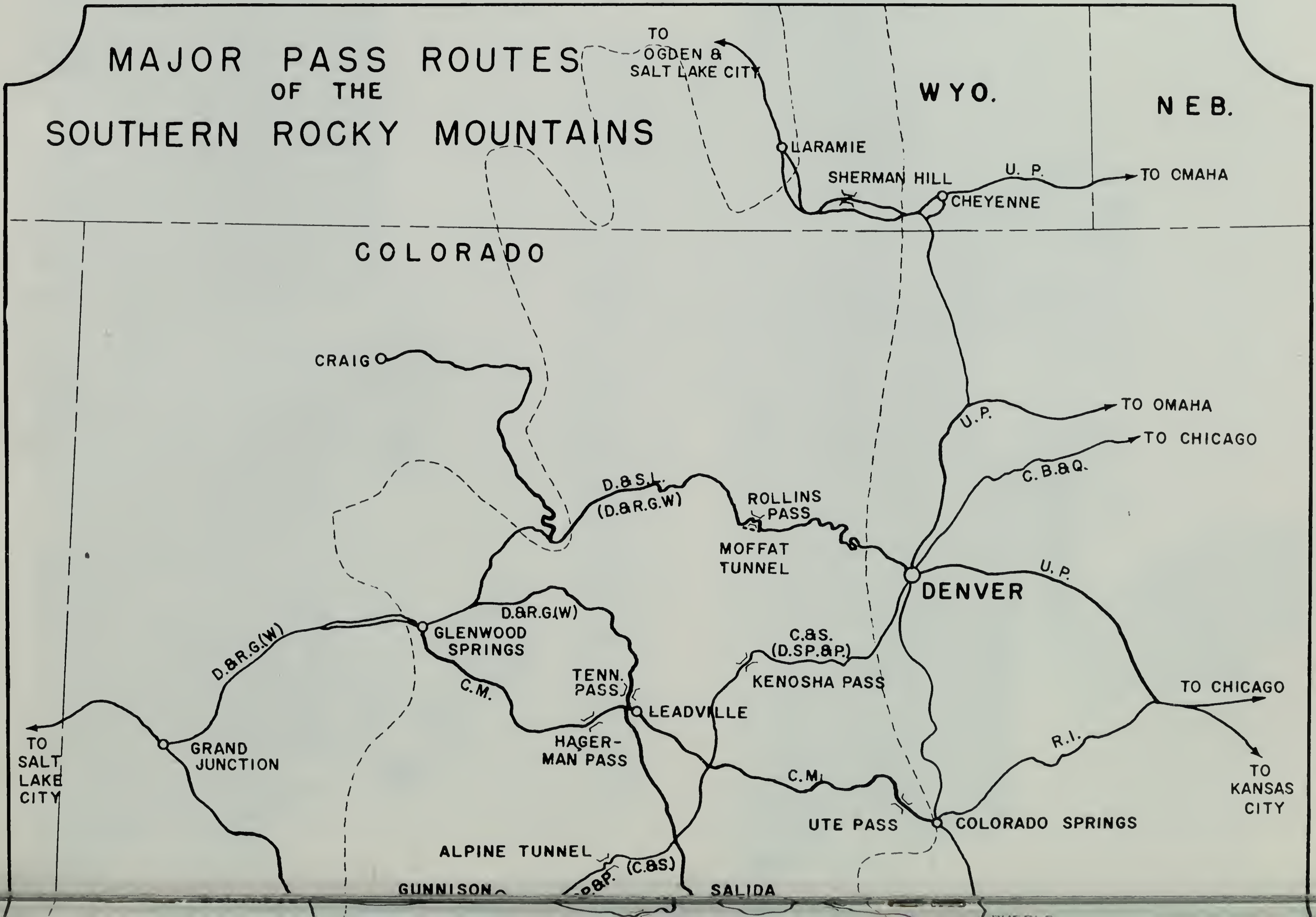
A.T.&S.F.R.R.
91



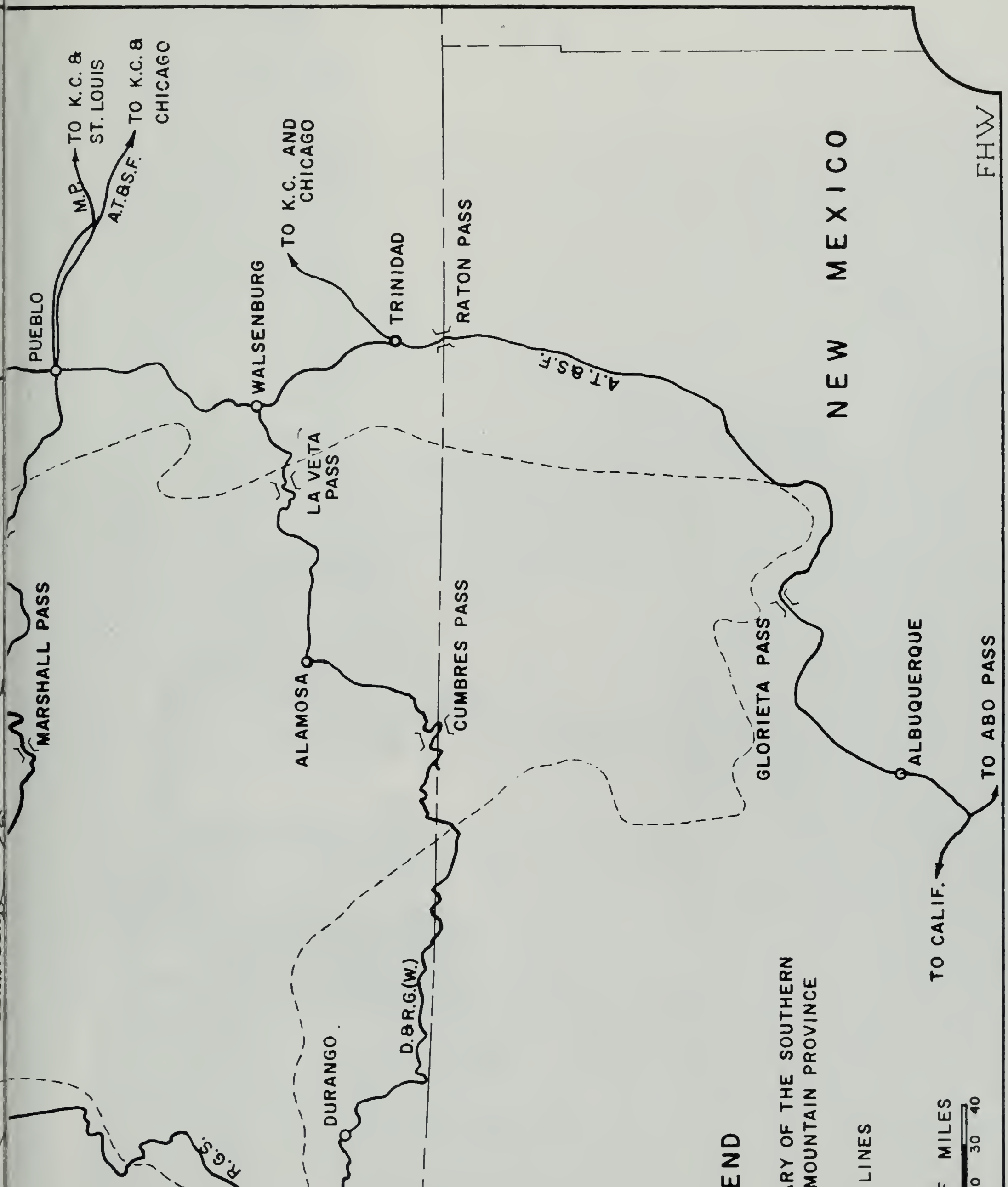
Above: Denver and Rio Grande Western Railroad
Below: Denver Public Library, Western Collection
Page 26, upper: Denver Public Library, Western Collection
Page 26, lower: Baldwin Locomotive Works, Courtesy Denver Public Library

In the beginning, motive power on all routes was small; the largest locomotive of the group pictured here weighed less than 30 tons (see roster). The DSP&P's Mason "bogey" No. 55 started out as No. 15. While all routes started with small power, only a few were forced to retain small power. This fact controlled the success or failure of the various routes.





MAJOR PASS ROUTES OF THE SOUTHERN ROCKY MOUNTAINS


PUEBLO
M.P.
TO K.C. & ST. LOUIS
A.T.&S.F.
TO K.C. & CHICAGO
WALSENBURG
TO K.C. AND CHICAGO
TRINIDAD
RATON PASS
A.T.&S.F.
LA VETA PASS
MARSHALL PASS
ALAMOSA
CUMBRES PASS
GLORIETA PASS
ALBUQUERQUE
TO ABO PASS
TO CALIF.
NEW MEXICO
D.&R.G.(W.)
DURANGO
R.G.S.
FHW
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BOUNDARY OF THE SOUTHERN ROCKY MOUNTAIN PROVINCE
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PASS
SCALE OF MILES
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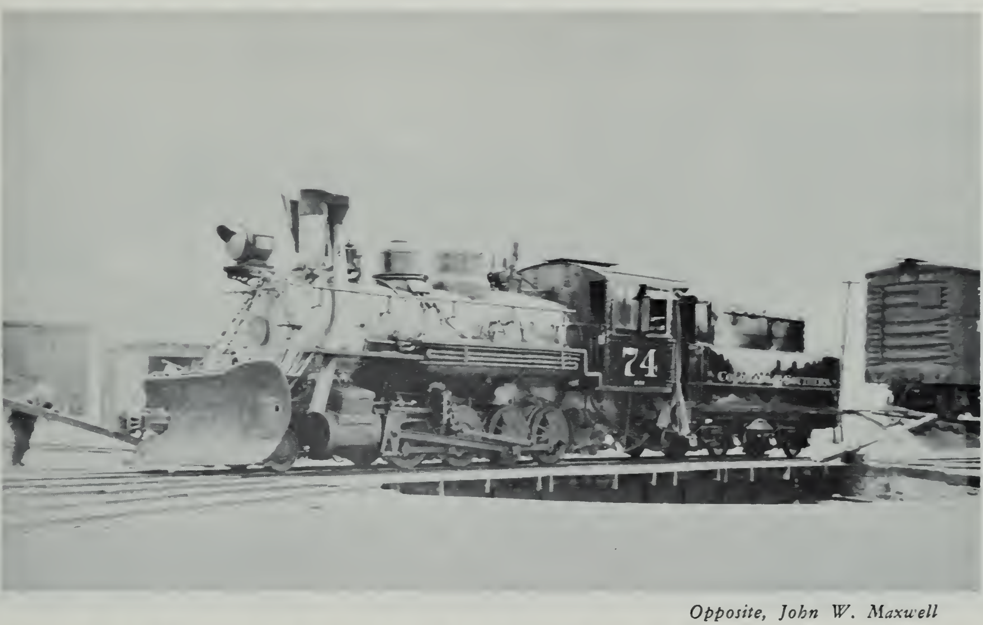
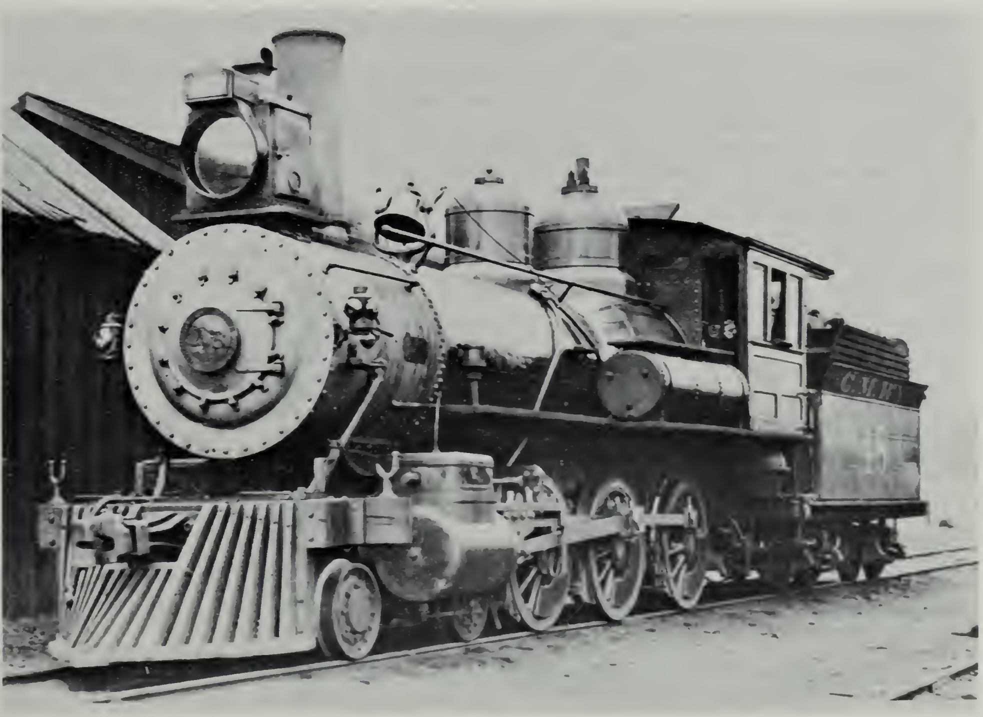
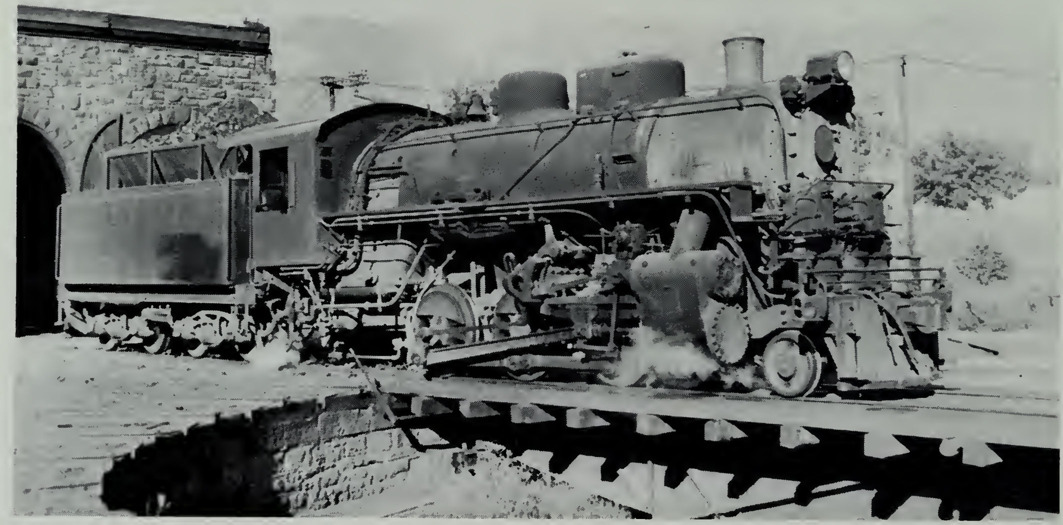


Opposite, John W. Maxwell

Opposite, a double-headed South Park branch train operates north of Chatfield, Colo., March, 1941. Above, No. 74 was a monster on the South Park route. Below, the Colorado Midland's 48 was purchased in 1890, three years after the route was constructed.





John W. Maxwell

The biggest power ever to work Ute Pass was Midland Terminal's No. 66, a 2-6-0 with 44,000 lbs. tractive effort.

VII FORMER ROUTES

Cumbres Pass has joined three other transportation routes that have entered the unblissful realm of oblivion — the historical past. Of the four previous routes, two of them were more or less replaced: The Moffat Tunnel provided a direct replacement for the 33 miles of 4% grade across Rollins Pass, and the Dotsero Cutoff downgraded the western portion of the Denver and Salt Lake to permanent branch line status. In addition, the Marshall Pass Route was more or less replaced by the Tennessee Pass Route. Both were D&RGW property.

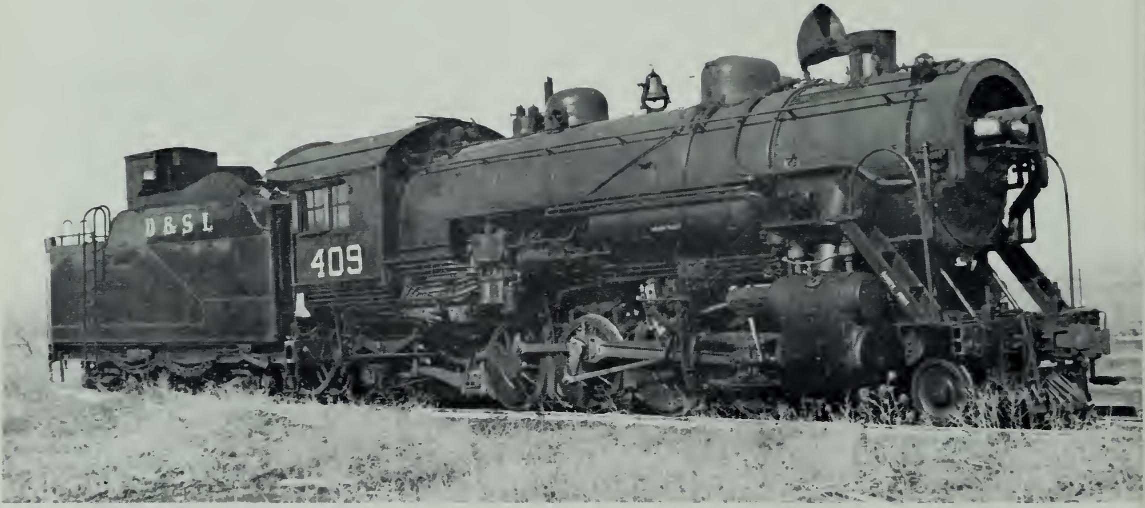
The Denver, South Park and Pacific went through many corporate metamorphoses before its final downfall as the Colorado and Southern. The projected line to the Pacific Ocean did reach the Pacific Slope at Gunnison, Colorado. From 1884 to 1910, it was possible to travel from San Francisco or Los Angeles to Chicago by way of the South Park Line. Unfortunately, the South Park violated the stipulation of one ascent and one descent in a given mountain region. The South Park climbed first Kenosha Pass (elevation: 9,991 ft.) then Trout Creek Pass (elevation: 9,346 ft.), and finally Altman Pass (Alpine Tunnel, elevation: 11,624 ft.) in crossing the Southern Rocky Mountain Province. The South Park had a cumulative climb of over 9,000 ft. between Denver and Alpine Tunnel. Compare this figure to the 4,000 ft. ascent on the Moffat Tunnel Route, and the 1,800 ft. ascent along the 1953 Sherman Hill improvement of the Union Pacific. It then becomes easy to understand why the South Park failed as a route. In addition, the route followed the Platte Canyon with its 3.7% grades and 28° curves. Furthermore, the metamorphic rocks (gneiss) in this canyon are extremely hard, preventing construction improvements along this segment of the route. The author has had the privilege of traversing most of Platte Canyon, the South Park and Trout Creek Pass segments, and much of the Alpine Tunnel portions of this route. To be sure, this route possessed some of the most spectacular scenery in all of North America. Both sides of the Sawatch Range at Alpine Tunnel have been heavily glaciated and the two palisades have been sculpted by glacial action. The photograph at Alpine Station (west portal of Alpine Tunnel) was taken in a glacial cirque basin. Many glacial deposits are also to be found in the glacial trough between St. Elmo and Romley on the eastern side of Alpine Tunnel.

In 1884, the Union Pacific-controlled Denver, South Park and Pacific opened its "highline" from Como to Leadville (Poor, 1949, p. 259). Leadville is on the Atlantic Slope, as are Como and Denver, yet this route traversed the Continental Divide. At Boreas Pass, the route crossed from Taryall Creek (Platte River drainage-Atlantic Slope) to the Blue River (Colorado River drainage-Pacific Slope). Then, at Climax in Fremont Pass, it crossed back over to the Atlantic Slope (Arkansas River drainage). This route, in accordance with the intent of its developers, provided local service to the flourishing mining district in the vicinity of Breckenridge, Dillon, and Leadville, Colorado. Although the route crossed the Continental Divide several times and became the main line for the Colorado and Southern's narrow gauged operations, it wasn't constructed for the purpose of operating a transcontinental route. In 1937, it was abandoned east of Fremont Pass. The Leadville-Climax portion of the route is still operated in 1971, in order to provide railroad service to the Climax Molybdenum Mine in Fremont Pass at Climax, Colorado. At 11,316 ft. above sea level, Fremont Pass is the highest point in the United States that has railroad service. Like the former narrow gauge route up to the Monarch Mine, in Monarch Pass, the Fremont Pass-Leadville branch of the Colorado and Southern has been converted to standard gauge.

In late 1886, James J. Hagerman began constructing his Colorado Midland Railroad west from Colorado Springs into the previously exclusive province of "narrow gauge" operations (Cafky, 1965, p. 16). By late 1887, the Midland had opened its route to Glenwood Springs, and in February of the following year service was opened to Aspen. This created a somewhat complex traffic picture. Palmer had relinquished control of the Denver and Rio Grande Railroad but had maintained his position on the Rio Grande Western Railroad. The Denver and Rio Grande was in the W. S. Jackson administration. The RGS now began to convert its Salt Lake City-Grand Junction line to standard gauge. The connecting link between Grand Junction and Rifle (Rio Grande Junction Railroad) was completed as standard gauge in 1890, thus opening an all-standard-gauge route from Colorado Springs to Salt Lake City. Meanwhile, the Denver and Rio Grande was furiously converting its Tennessee Pass route to standard gauge operation.

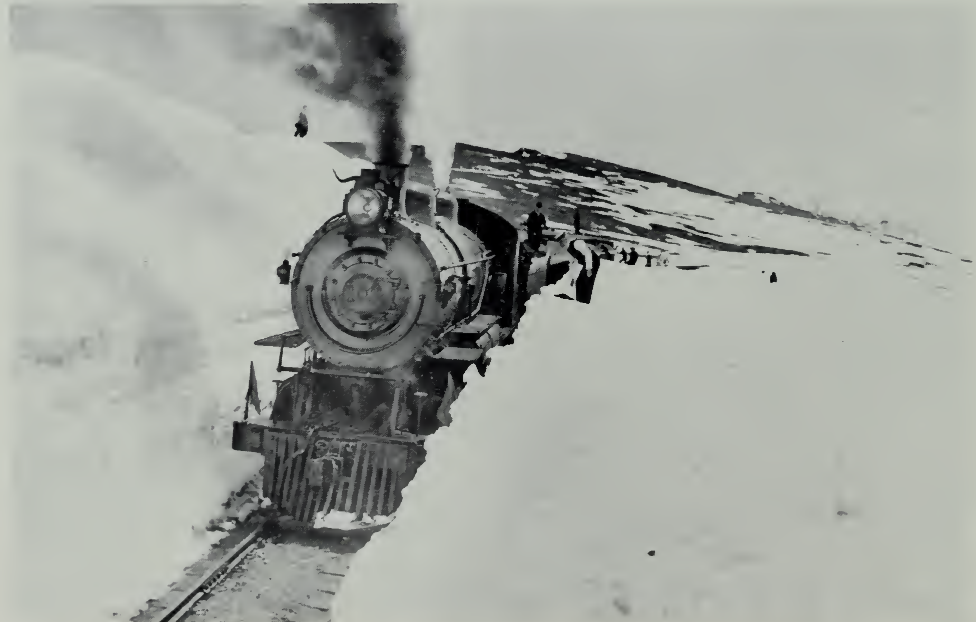
The Colorado Midland had a time advantage with respect to standard gauge operations. It also possessed a distinct advantage over the D&RG with respect to distances. From Denver to Grand Junction was 372 miles by way of the Colorado Midland, compared to a distance of 447 miles by way of the D&RG. Grand Junction was 298 miles west of the CM's gateway city (Colorado Springs), while it was 327 miles from Pueblo (the D&RG's gateway city). The Colorado Midland possessed a route situation that was equal to the D&RG in other respects. The real difference between the routes was a matter of pass situation. From the Great Plains, the D&RG had to cross only one pass to reach Grand Junction, while the Colorado Midland had to cross three passes. Trout Creek Pass did not contain any severe limitation, but Ute Pass-Hayden Divide presented severe problems in the form of 4% grades and 16° curves. Hagerman Pass also contained 16° curves and 3.4% grades, plus climatic and operational liabilities that exist at the elevation of 11,528 ft. in the Colorado Rockies. In 1893, the completion of the Busk-Ivanhoe Tunnel reduced this summit elevation to 10,953 ft.[8] This was not a great deal higher than Tennessee Pass, but the CM climbed three summits, while the D&RG only climbed one summit. The descent from Bath (Trout Creek Pass) through Buena Vista to Wild Horse amounted to 1,435 ft., and the descent from Divide to Lake George was 1,220 ft. The Colorado Midland had to climb this 2,655 ft. stretch *twice* in order to traverse the Southern Rocky Mountain Province.

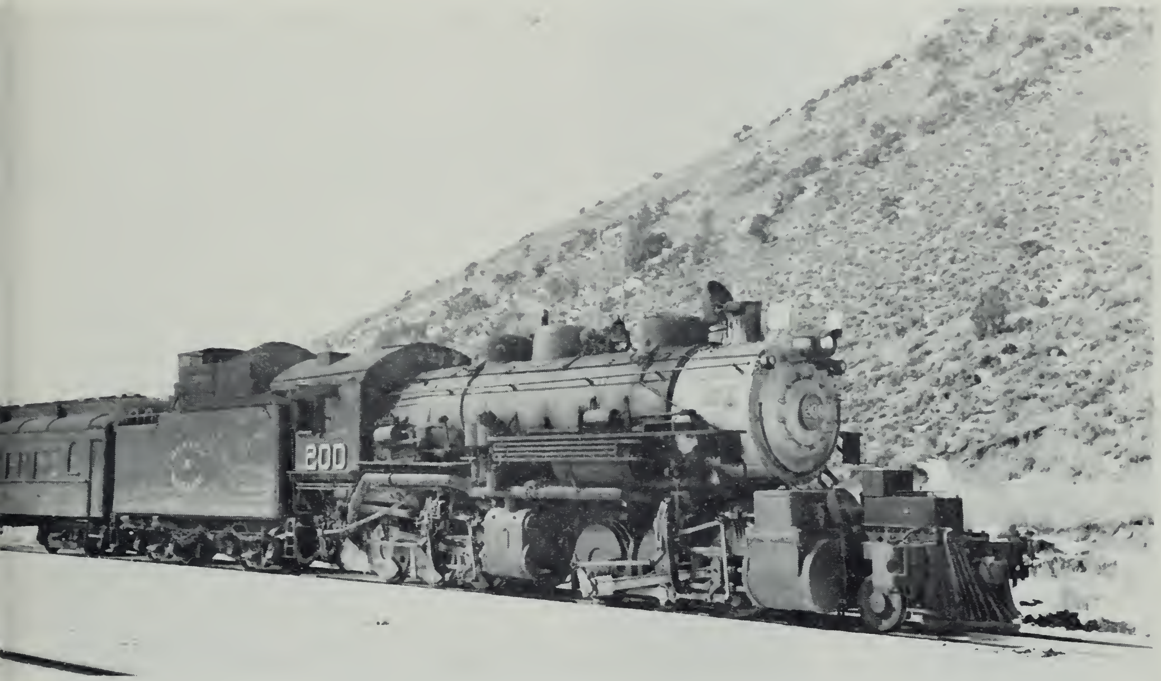
The 4% grade up Ute Pass could have been eliminated by proper construction. This would have left a ruling grade of only 3.4%. The Chicago Rock Island and Pacific might have attempted to develop the Midland as an extension of its own line from Chicago to Colorado Springs. One can observe distinct potentials, especially if Ute Pass had been improved, and if the 2-6-6-0 type locomotive, which was capable of negotiating 16° curves, had been purchased. If this had been the case, Colorado Springs might have possessed a good main-line route to the West Coast, and Denver would have remained as a branch-line town. In this case, a larger portion of Colorado's important wholesaling and distributing activities might have been established in Colorado Sprngs, instead of in Denver.



Above, John W. Maxwell
Below, L. C. McClure, Courtesy Denver Public Library, Western Collection

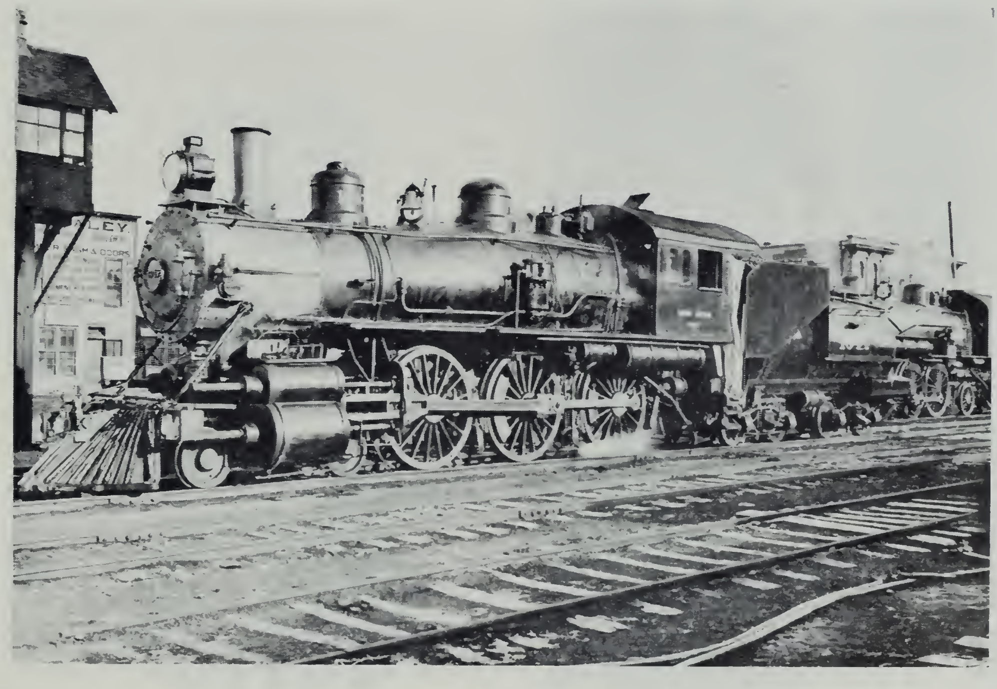
Above, Lima-built No. 409 sits at Utah Junction, 1947. These low-drivered, coffin feedwater-equipped "Mikes" were operated on the Craig Branch of the D&SL by the D&RGW well into the 1950's. Below, No. 100 of the Moffat Road poses with the *Yampa Valley Mail* on the Flat Top Peneplain. This photograph was most likely taken in June of 1905. Notice how the snow is absent in the background. This view clearly illustrates the validity of the maxim "stay down in the trees". On the "tundra", at this location, snowdrifts were often the largest relief features to be observed in the spring of the year.

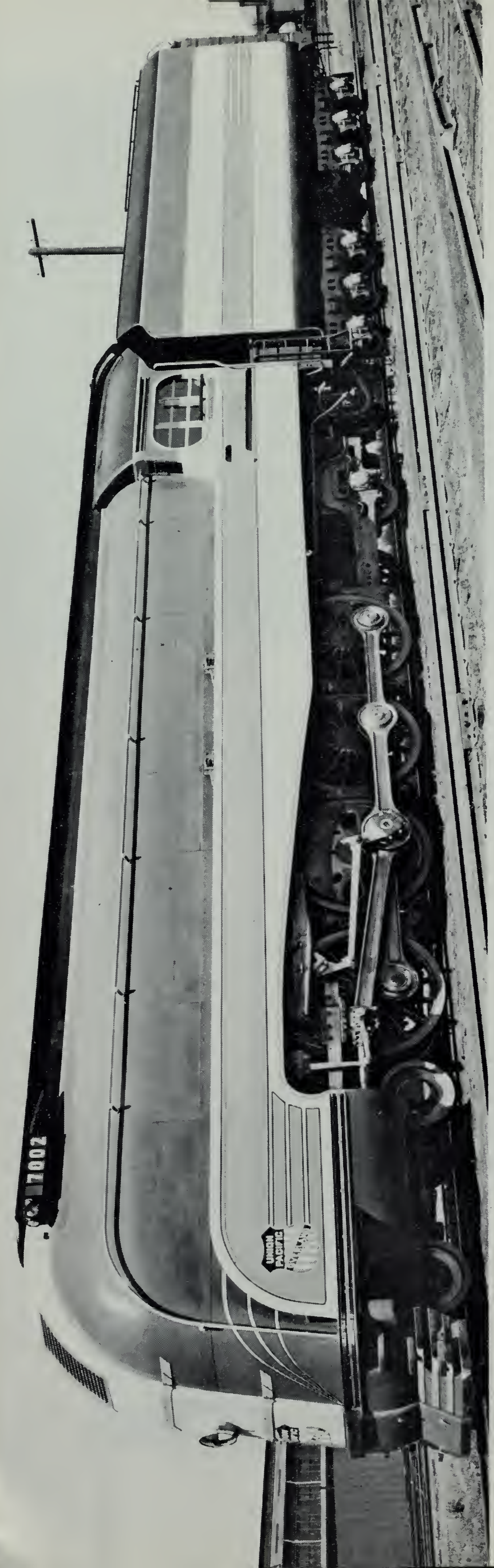




Above, John W. Maxwell
Below, Fred Jukes, Beebe Collection, Courtesy Denver Public Library

Above, in 1908, the Moffat Road began taking delivery on the 200-class 0-6-6-0's, which were converted to 2-6-6-0's. These mallets were true mallets; notice both high and low pressure cylinders. Here, we see No. 200 with a ski train at Hot Sulphur Springs in 1941. Below, a Vauclain compound 4-6-0 of the Union Pacific. D&RG, Santa Fe and the Union Pacific all tried compounding in some form or other.





Left, Union Pacific Railroad
Upper Right, Union Pacific Railroad
Lower Right, W. D .Warren

The 7002 represents an excellent example of early heavy duty passenger power. When built in 1922, it was perhaps the most modern locomotive available for passenger operations in mountainous regions. Above, the 9000-series 4-12-2's were labeled ugly by many people. To the author, they are one of the most interesting examples of locomotive power. The massive appearance is accentuated by the heavily-decorated smoke box, the "long-barreled" look, and the Vanderbilt tender. Also, their three-cylinder configuration required the "Gresley Bar" as a synchronization mechanism, which added to their appearance. No. 9027 works a freight across the Kansas Plains almost 30 years after it was built. Below, the *City of Portland* descends the Continental Divide at Creston. The topography of the spine of the continent can best be described by the word "featureless". Compare this landform situation to the Eagle River Canyon or Hagerman Tunnel.

UNION
PACIFIC
THE
OVERLAND
ROUTE

UNION
PACIFIC
THE
OVERLAND
ROUTE

UNION
PACIFIC
RAILROAD

Instead of the Rock Island, the United States Railroad Administration entered the picture in 1917. When the U.S.R.A. diverted all through traffic away from the Colorado Midland to the somewhat longer D&RG in May, 1918, it was the end of the line for the Colorado Midland. The Midland's most powerful locomotives were the Consolidations that were delivered in 1907 with a tractive effort of 44,305 pounds. One can only wonder what modern power and an improved right of way could have meant for the present-day Colorado railroad picture. If David Moffat's "Denver Short Line", from Denver to Lake George,[9] had been constructed instead of his Rollins Pass Route (DNW&P), one would possibly find long high-speed freight trains traversing the flat basin of South Park rather than Middle Park.

VIII SUMMARY

The broad brush picture of transcontinental railroad routes in the Southern Rocky Mountain Province can be thought of in terms of three major elements: the routes and adjacent landforms, the urban settlement pattern, and the progressive development of locomotive size.

TABLE V — SOUTHERN ROCKY MOUNTAIN RAILROAD PASSES

RAILROAD & DATE	PASS	ELEV.	MAXIMUM		Landform Type or Other Comments
			GRADE	CURVE	
UP					
1868	Sherman Hill	8,242′	?	Min.	The U.P. has continuously improved its route which has extremely favorable landform characteristics (pediments).
1902	Sherman Hill	8,013′	1.52%	Min.	
1953	Dale Creek Cutoff	7,876′	.82%	Min.	
1869	Creston	7,107′	.82%	Min.	Crossing of the Continental Divide (Wyoming Basin).
AT&SF					
1878	Raton Pass	7,588′	3.50%	10°30′	All of these passes are in subhumid country on sedimentary rocks. Abo Pass has largely replaced the Raton-Glorieta Route.
1878	Glorieta Pass	7,455′	3.09%	10°00′	
1879	Continental Divide	7,249′	0.62%	1°30′	
1900	Abo Pass	6,508′	1.25%	2°00′	
D&RG					
1880	Royal Gorge	5,660′	1.41%	12°40′	None of these passes are especially high or difficult. Three of the four are currently operational. Cumbres, Marshall and Tennessee Passes bear evidence of glacial erosion.
1881	Cumbres Pass	10,115′	4.00%	20°	
1881	Marshall Pass	10,856′	4.00%	24°	
1887	Tennessee Pass	10,212′	3.00%	12°22′	
D&SL (D&RGW)					
1904	Rollins Pass	11,660′	4.00%	16°	Rollins Pass involves the ascent of a precipitous cirque head wall. The Moffat Tunnel eliminated Rollins Pass.
1938	Moffat Tunnel	9,239′	1.00%	12°48′	
1934	Dotsero Cutoff	6,692′	.70%	7°30′	
DSP&P					
1879	Kenosha Pass	9,991′	3.60%	28°	Kenosha Pass involves ascending a fluvial valley that is incised into "gneiss". Altman Pass (Alpine Tunnel) has been severely glaciated.
1883	Alpine Tunnel	11,624′	4.00%	24°	
1884	Boreas Pass	11,493′	4.00%	24°	
CM					
1887	Ute Pass-Divide	9,198′	4.00%	16°	Ute Pass crosses a fluvial divide. Hagerman Pass was heavily glaciated. The Busk-Ivanhoe Tunnel bypassed Hagerman Tunnel.
1887	Hagerman Tunnel	11,528′	3.24%	16°	
1893	Busk-Ivanhoe Tunnel	10,994′	3.24%	16°	

Table V shows the physical characteristics of the routes under discussion, but it does not attempt to convey the entire story. For instance, it does not indicate that the Ute Pass-Divide elevation is for the 1903 realignment that was excavated by Panama Canal shovels, or that points such as Hellgate, in the Frying Pan Valley, were severely glaciated. However, at a glance, one can observe which routes exceeded 11,000 ft. and flirted with the tree line. (Above the tree line, drifting snow was a severe problem on Rollins Pass and also at Hagerman Tunnel and Alpine Tunnel in the Sawatch Range.) In the Park or Gore Ranges, Boreas Pass was located below the tree line; however, because the tree cover had been removed, extensive snow fences were required. We have noted that in this mountainous region, there are many fairly level areas. The Continental Divide crossings on the Union Pacific and Santa Fe occur on topography that is very gentle with respect to relief. Sherman Hill (Laramie Range) also involves a flat upland surface. On the other hand, the route of the Denver and Salt Lake assaulted a precipitous cirque head wall in order to attain the nearly level "Flat Top Surface" or "Flat Top Peneplain". We have noted that the South Park tackled the very hard metamorphic rock of the South Platte Canyon, while the Moffat Road (D&SL) circumvented the canyon bottoms by using rock platforms (pediments) as stair steps in order to enter South Boulder Canyon at a level high above the canyon floor. Finally, we can observe that all four of the passes that exceeded 11,000 ft. have been abandoned for over 30 years. Of the two passes that exceed 10,500 ft. elevation, Marshall Pass was abandoned in 1955, and the Busk-Ivanhoe Tunnel was abandoned in 1922. Following a 20-year period of service as an automobile tunnel, the Busk-Ivanhoe Tunnel was converted for the purpose of transferring water from the Pacific Slope to the Atlantic Slope.

The Future Of The Existing Routes

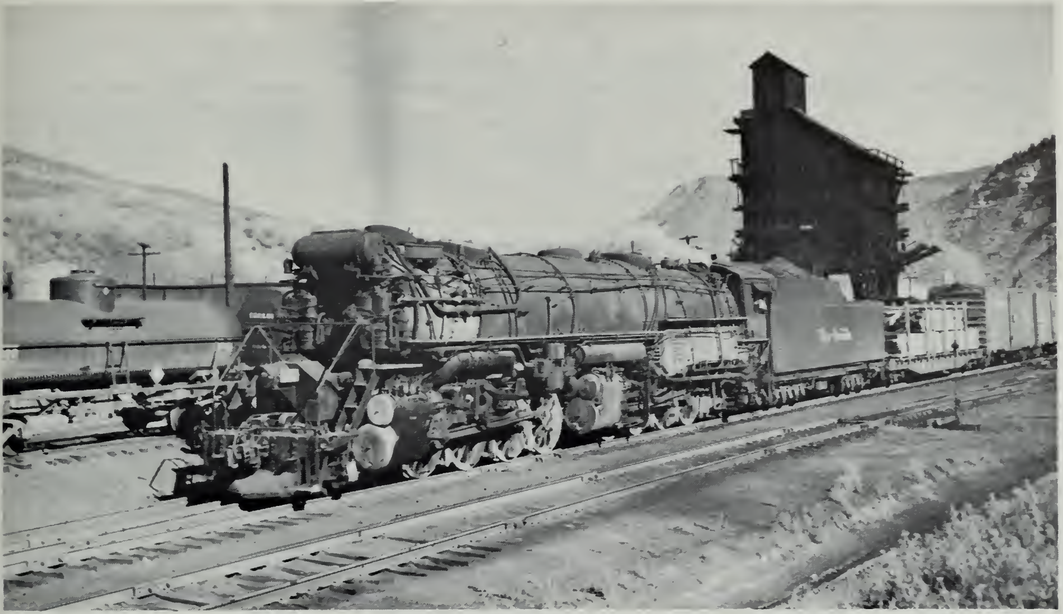
The outlook for the future is that the Union Pacific will continue to be the Southern Rocky Mountain Province's busiest route. Between 30 and 40 trains per day presently cross Sherman Hill. The second busiest line is the Moffat Tunnel Route with eight freight trains per day in each direction. The Royal Gorge-Tennessee Pass route averages about six freight trains per day. In Raton Pass there is one freight train in each direction, plus the *Super Chief-El Capitan.* The double track from Trinidad to Wootton now appears to be superfluous. Ten or more trains per day passed through Raton Pass. Even though this pass may appear to be fading fast, unit trains from the York County coal mines to Fontana, California and Pueblo, Colorado, will keep this route active for a long time to come. Unfortunately, Cumbres Pass appears to be destined to the fate of Marshall Pass, Alpine Tunnel and Hagerman Pass. La Veta Pass currently sees a daily freight from Pueblo to Alamosa. This pass will probably continue to function at about this level of activity.

Urban Settlement

We have noted that urban activities have grown in places that have transportation accessibility. (Mining camps are excepted from the above statement.) The fortunes of Denver, Cheyenne, Pueblo and Colorado Springs have been oriented to railroad activities that have resulted from the focusing of routes (nodal function or gateway function). Places such as Como, Sherman, Arrow, Sargents and Hartsel were created by the coming of the railroad. All of these places, including old Sherman, have declined or become ghost towns now that the railroad is no longer present. In the Southern Rocky Mountain Province, urban settlement depends almost exclusively on two factors; exploitable ore bodies, and transportation access. Usually, if an ore body contained valuable minerals, a railroad was constructed to the site, regardless of grades, curves and other topographic problems. Even though today the railroad does not appear to be very important to a city or town, in most cases the town's establishment was a direct result of railroad accessibility.

In 1870, locomotives seldom exceeded a weight of 75,000 pounds; the *Montezuma* tipped the scales at a hefty 25,000 pounds. With the passage of time, locomotives became much larger with several types being as much as fifteen times larger than the *Montezuma.* In addition to size, boiler pressures increased from 140 lb. per sq. in. to over 300 lb. per sq. in. Roller bearings had been introduced, and by the late 1920's, the combustion chambers of some locomotive fire boxes had grate areas that exceeded 100 sq. ft. As more work could be accomplished with the improved equipment, wages were increased. Railroads that were unable to adapt to the changing equipment soon found themselves in a financial squeeze between increasing employee wages, and static production per man hour. This is illustrated by the following comparative roster and photographs.

RIO GRANDE SOUTHERN
No. 5
5



Opposite, John W. Maxwell
Above, R. W. Richardson, Courtesy Colorado Railroad Museum
Below, John W. Maxwell

Opposite, the Rio Grande Southern does not appear to need large locomotives to judge by this view of "Galloping Goose" No. 5. This photo provides an excellent example of the thick-bedded sandstone rock that lines the San Miguel River. Above, in 1927 the Rio Grande placed in service a class of simple articulateds of the 2-8-8-2 wheel arrangement. These ponderous machines developed an unheard-of tractive effort of 131,000 lbs. These monsters, with their 63-inch drivers, went to work on the Eagle River Canyon and Tennessee Pass. Twenty-seven years later, Bob Richardson captured the alpha of the class departing Minturn for the Eagle River Canyon and Tennessee Pass. Below, the transition from a slow-speed, drag-type helper to a high-speed road engine was successfully accomplished with the 3700 class 4-6-6-4's. With their 70-inch drivers and a tractive effort rating of 105,000 lbs., these locomotives proved very effective as mountain haulers. Articulation permitted them to have the short wheelbases required by the Rio Grande's many sharp curves. On this day, in July, 1940, the 3701 was seen departing Salt Lake City with Train No. 1, the 13-car *Scenic Limited.*

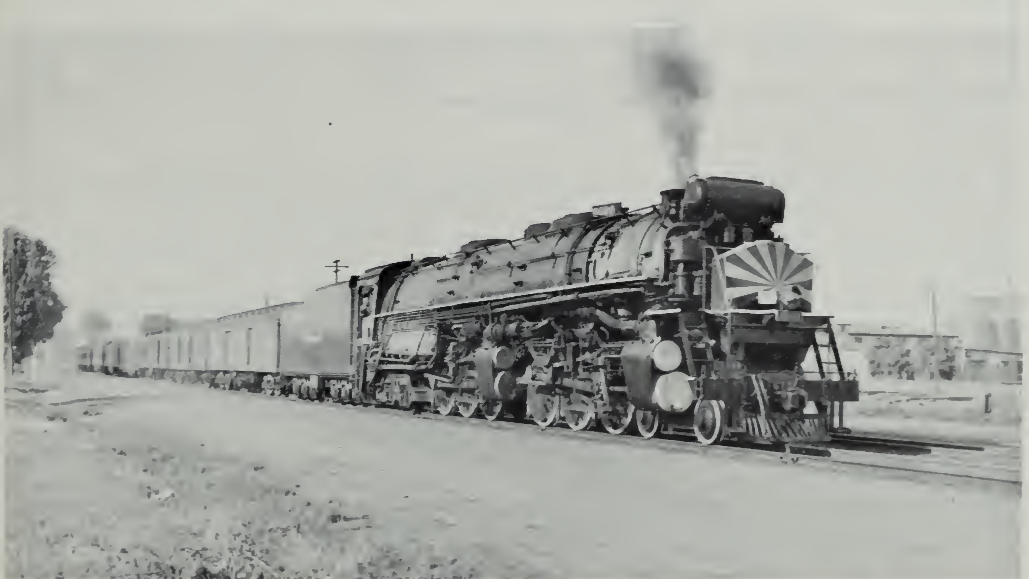


TABLE VI
PARTIAL LOCOMOTIVE ROSTER

NUMBER	YEAR	TYPE	ENGINE WEIGHT (LB.)	DRIVER DIAMETER	BOILER PRESSURE (LB.)	TRACTIVE EFFORT (LB.)
UP						
1	1865	4-4-0	45,000	56″	- -	8,540
1847	1900	4-6-0	- - -	73″	200	25,247
5000	1917	2-10-2	368,500	63″	200	70,450
9000	1926	4-12-2	515,000	67″	220	96,650
843	1944	4-8-4	490,700	80″	300	63,800
3950	1942	4-6-6-4	627,000	69″	280	97,350
4023	1944	4-8-8-4	772,000	68″	300	135,375
AT&SF						
91	1879	4-4-0	48,000	57″	140	14,200
3821	1919	2-10-2	414,700	63″	220	85,360
3776	1941	4-8-4	494,630	80″	300	66,000
5021	1944	2-10-4	538,000	74″	310	93,000
D&RG						
1	1871	2-4-0	25,000	40″	?	3,580
346	1881	2-8-0	74,260	37″	160	18,947
493	1902	2-8-2	187,250	44″	200	37,100
3400	1913	2-8-8-2	458,000	57″	200	95,000
3610	1930	2-8-8-2	665,000	63″	240	131,800
3710	1942	4-6-6-4	642,000	70″	255	105,000
1800	1937	4-8-4	470,000	73″	285	67,200
D&SL						
100	1904	2-8-0	209,500	57″	- -	42,420
400	1915	2-8-2	295,000	55″	- -	62,700
200	1903	2-6-6-0	362,000	55″	- -	76,400
DSP&P						
15	1879	2-6-6T	45,000*	37″	- -	- - -
76	1897	2-8-0	85,000*	37″	180	21,176
CM						
25	1887	4-6-0	117,000	60″	160	17,031
1	1886	2-8-0	115,500	52″	160	24,915
301	1907	2-8-0	193,000	52″	200	44,305

* Weight on drivers

Note that the locomotives of the 1870-1880 period were already dwarfed by the motive power that was constructed in the 1900-1910 period.

Of the surviving railroads, two items stand out. The Union Pacific and the Denver and Rio Grande Western possessed extremely large power. The Union Pacific's 4000's were the heaviest locomotives to ever operate on the surface of the earth. The Union Pacific's 4-12-2's had the longest rigid wheelbase of any motive power anywhere in the world. One may wonder how the Santa Fe ever operated its 3751 series and 2900 series 4-8-4's around the 10°30′ curves of Raton Pass. These locomotives had a driving wheelbase of 21′3″, but their rigid wheelbase was only 13′10″. The first pair of drivers possessed a "Franklin lateral motion" device which permitted some lateral motion in the locomotive's first pair of driving wheels, and thus permitted these extremely large locomotives to negotiate sharp curves. This same device reduced the 2-10-4's rigid wheelbase from 26′2″ to 19′3″. With the Santa Fe's ruling grade of only 1.25% on the Abo Pass-Continental Divide Route, these locomotives, with their 74″ drivers and 93,000 lb. tractive effort, certainly merit consideration as an excellent example of a design which fulfilled a given set of functional requirements. Today, in the era of the diesel locomotive, one may question the continuing validity of the concept of a route's "effectiveness" being a function of its landform situation. It is true that rigid wheelbases are very short on diesel locomotives. Also, a great deal of horsepower can be assigned to trains on steep grades. However, a diesel-powered train is forced to slow down for a 12° curve, just the same as a steam-powered train.

AUTHOR'S COMMENTS

The photographs in the above article were selected from three hundred photographs that will hopefully appear someday in a book on this subject. From Canoncita to Georgetown, and from Tabernash to Hermosa, the author has had to delete more of the story than he has been able to include. However, the book will have to wait until the author completes his Ph.D. in Geography. This program, which includes a split minor in City Planning and Geology, is in progress at the University of North Carolina. For the past several years, the author has been employed by the Jefferson County Planning Department. Both the Kenosha Pass Route and the Moffat Tunnel Route traverse Jefferson County in climbing the Rockies. This explains the abundance of D&RGW photographs.

The author owes a great debt to many people that have provided him with both ideas and information. John Maxwell's photographs add greatly to this article; however, Mr. Maxwell's greatest contribution has been his conversations with the author on the subjects of this article. Hopefully, John has prevented the author from plunging off the so-called deep end. Jim Davis, of the Western History Department, has steered the author to a wide variety of information sources and photographic collections. Bob Richardson and the Colorado Railroad Museum have been of similar assistance. Lastly, the Atchison, Topeka and Santa Fe Railroad, the Denver and Rio Grande Western and the Union Pacific have been very helpful in providing photographs, engineering details and traffic information.

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10. M. C. Poor, *Denver South Park and Pacific*, Rocky Mountain Railroad Club, 1949.
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12. Personal Field Work. During the past two summers, the author has spent over thirty weekends investigating the passes mentioned in this article.

FOOTNOTES

[1] All surfaces of earthen material can be termed as being either transported, that is soil brought in from somewhere else; or residual soil that has not been transported, that is, the original soil.

[2] In the middle area of elevation, the features are produced by the actions of streams or rivers. The term fluvial is used to relate to the action of water in streams, rivers and lakes.

[3] A cirque basin is the beginning point from which glaciers start their movement down the valley or glacial trough. An alb is a flat or gently inclined narrow shelf separating the nearly vertical side of a glacial trough from the mountain slope above.

[4] Hopefully, the geologist and earth scientist will excuse the oversimplification of both rock nomenclature and the arguments concerning morphogenetic aspects of the landscape.

[5] The AT&SF threatened to parallel every mile of D&RG track with its own standard gauge lines.

[6] Moffat's construction engineers clearly demonstrated that they understood the use of elevation gaining devices.

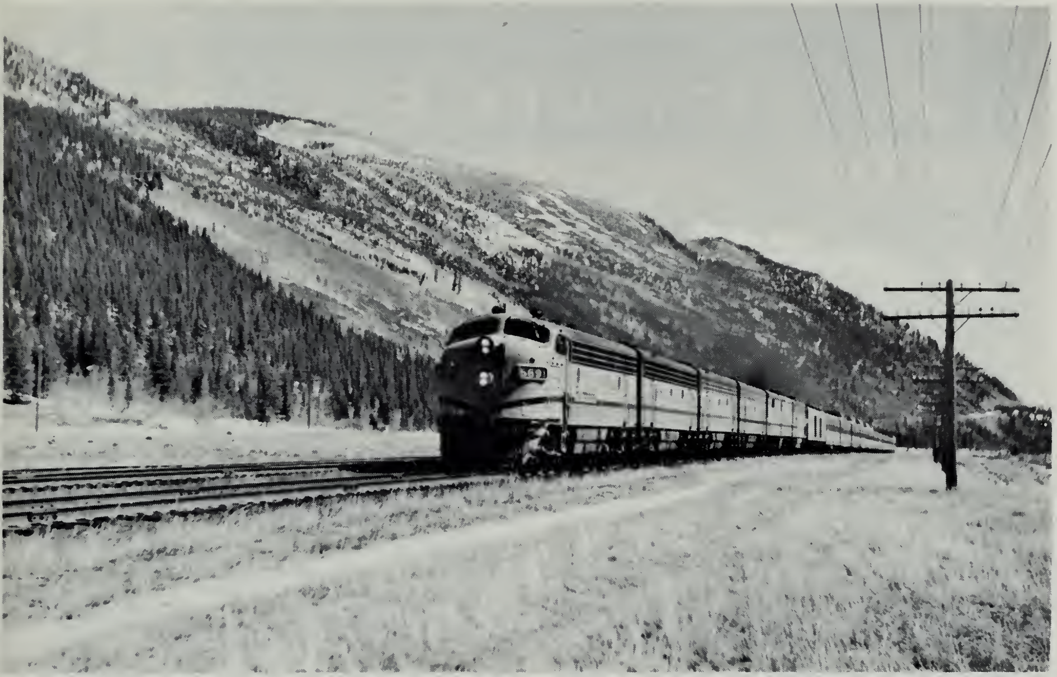
[7] The Flat Top Peneplain is a remnant of a peneplain of Miocene age. A major semantic dispute exists in the earth sciences with respect to the appropriate name for this feature.

[8] Morris Cafky devotes a chapter of his book *Colorado Midland* to the subject of the struggle between the Midland and the Busk-Ivanhoe Tunnel Company. In 1897, the Midland had a falling out with the tunnel company and reverted to its Hagerman Tunnel Route at an elevation of 11,553'. On January 28, 1899, the "Highline" was closed by a blizzard, and the Midland was blockaded for 78 days until April 14, 1899.

[9] This route would have followed the Middle Fork of the South Platte River.

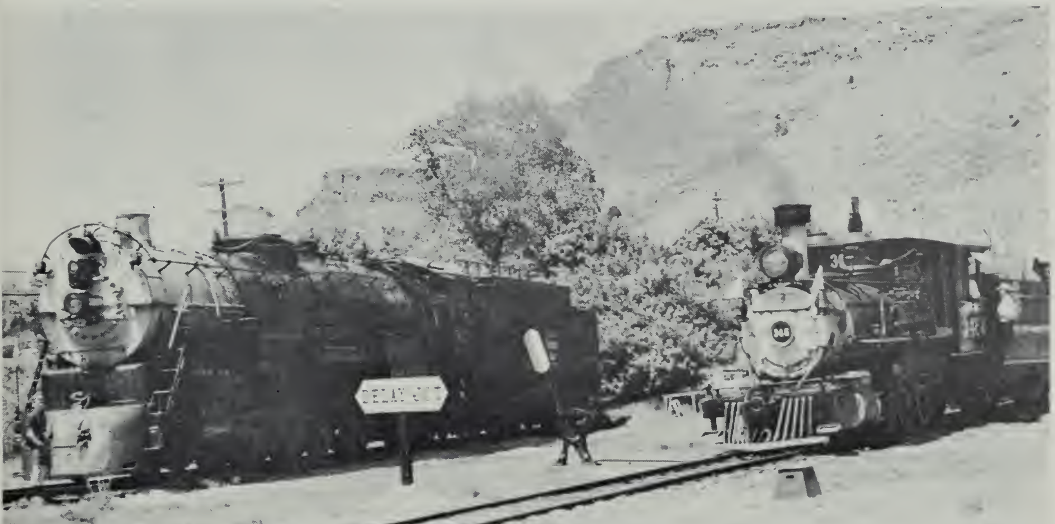
Above, John W. Maxwell
Below, Santa Fe Railway; Photo by R. C. Bradley

Above, one of the 3751-series 4-8-4's of the Santa Fe takes water at Colorado Springs in 1950. The raised stack and the location of the air pumps under the cab typify Santa Fe's 4-8-4's. Colorado Springs was a gateway city that lost both its gate and its "iron-way" when the Colorado Midland passed away in 1922. Below, a unit train passes Ribera, N.M. on the Raton Pass-Glorieta Pass Route. This train consists of York County, N.M. coal bound for the Kaiser steel mill at Fontana, Calif. Notice the mid-train slave that is composed of "SD" units. If the Raton-Glorieta Route is to survive, it will be due to mineral resources shipments such as this.



Both, W. D. Warren

Above, the *California Zephyr* ascends the U-shaped glacial trough between Tolland, Colo. and the Moffat Tunnel. The construction of this segment of the railroad was an easy task. The first rung of the "Giant's Ladder" is visible above the *Zephyr's* last dome. Below, a comparison of size. On June 2, 1968, the ex-D&RG No. 346 steams past ex-CB&Q 5629, at the Colorado Railroad Museum near Golden, Colo. The 346 tips the scales at 37 tons, while the "Q's" engine weighs 228 tons, or six times as much. The 90-year-old 346 is still very spry, and manages to ignite brush fires and scare the local dogs, chickens and cows in the vicinity of Table Mountain.



Chapter ACTIVITIES

BALTIMORE

Bulletin Staff Photographer Ara Mesrobian presented a program at the May meeting featuring slides of diesel, electric and steam railroading in Austria and Switzerland. For the June meeting, John F. Collins, Jr. of Philadelphia provided a New York Central program. Shown were the films **Running the Railroad** and **The Steam Locomotive**, produced by the NYC, as well as scenes of Empire Service passenger trains, NKP 759, and other subjects as filmed by Mr. Collins.

The July meeting, in cooperation with the Baltimore Streetcar Museum, featured both a dinner and entertainment program. Held in connection with the restoring of BSM Car No. 3828, for which the Chapter made a financial contribution, the program began with a buffet dinner at the museum. Afterwards, the program moved to the Chapter's meeting room in the Baltimore Life Building. Following the business portion of the meeting, Roland Nuttrell of the BSM presented a slide program, with taped commentary, about the streetcars of Baltimore.

For August, Victor J. Campbell and George L. Fleming furnished a movie and slide program covering an 1100-mile trip to the Pacific Northwest.

As a result of a survey among Chapter members, a bus-train trip was held on August 14. Traveling from Baltimore by chartered bus, the group visited the NH&I at New Hope, Pa. and the BR&W at Ringoes, N.J. These were the preferred carriers members wished to visit on this year's annual summer trip conducted by the Chapter.

Dinners aboard the Chapter dining car located at Camden Station were held during the summer months; in keeping with the season, a crab feast was enjoyed by guests on June 27.

ATLANTA

At the April meeting, Mr. Robert Bryant, district sales manager for the C&O, presented a slide-lecture program about the ASTRO program. For May, Bryant Petitt, Jr. showed slides of various steam passenger locomotives, passenger trains around the Chicago area prior to Amtrak, and Southern diesels climbing Saluda Hill. The June meeting featured the 3-M movie **Ballad of the Iron Horse**, which had been previously telecast over the ABC network. The July meeting was held at a new location, the Bank of Fulton County in East Point. Slides and movies, with narration by Col. James G. Bogle and Henry L. Howell, were shown of the May, 1971 Cass Scenic-Greenbrier Railroad weekend in West Virginia.

The annual **Dogwood Special** steam excursion between Atlanta and Gainesville, Ga. was operated on April 17. Over 500 passengers enjoyed the trip, with a number of them also taking the special bus tours provided by the Chamber of Commerce of Gainesville. Ex-S&A No. 750 operated well, although at times the ten-car train appeared to tax the locomotive's capacity. The observation car **Lookout Mountain** was the most popular car on the train, with many passengers standing for the entire ride.

On April 30, No. 750 headed the last run of the Central of Georgia's **Nancy Hanks** for a 20-mile portion between Atlanta and Jonesboro.

The Chapter sponsored a **Georgia Peach Special** excursion on July 3 headed by the 750 and Southern Railway's No. 722. The train operated between Atlanta and Macon, Ga., with an "old-fashioned" barbecue dinner being served to the passengers while in Macon.

The Chapter's roster of equipment, as of April 15, 1971, included the following: eight steam locomotives; four diesel or electric locomotives; 27 passenger cars, including three diners and two office cars; four freight cars; two cabin cars; three maintenance of way cars; two streetcars; and one bus. All 51 units were acquired through donations by various corporations and individuals.

An extensive collection of railroad material, including passenger traffic literature, passes, annual reports, timetables and other items has been donated to the Chapter museum by relatives of the late B. H. Curley, who retired as treasurer, auditor and traffic manager of the Chattahoochee Valley Railway, West Point, Ga.

George W. West, Sr., Chapter member and prominent Atlanta business and civic leader, passed away on May 15. Mr. West, who was chairman of the board of the West Lumber Co., had supported the Chapter in many ways, including the donation of lumber for upgrading the interior of ex-L&N baggage car No. 269.

An HO gauge diorama, constructed over a 14-year period by Mr. Ralph Dillon, has been donated to the museum. Housed in a semi-trailer, the exhibit contains 637,000 pieces of material and weighs over 4000 pounds. It was donated by Mr. Jack Wright of Powder Springs, Ga.

CENTRAL OKLAHOMA

Entertainment for the April meeting consisted of slides by Jimmy R. Pattillo, as well as additional films by the Westinghouse Corp. and Whiting Washers. Edwin K. Birch, Sr. provided a program of films for the May meeting. For June, the L&N film **Here Comes the General** was shown. Additionally, Preston George presented a movie on railroading in Oklahoma, including steam, early diesels, and the **Texas Chief.** Movies of the Oklahoma City Interurban, as presented by Dr. George L. Winn, and the first Amtrak train into Oklahoma City, as filmed by Milton R. Scholz, were shown at the July meeting.

A Chapter picnic, organized by Mrs. Matt Hudson, was held on June 5. On August 21, "Trade Day" was conducted at the home of Edwin Birch, Sr., with hamburgers being served at the dinner hour.

Members of the Chapter were aboard the Santa Fe's passenger train between Tulsa and Kansas City immediately before its discontinuance. On June 12, over 20 members gathered at the Horse Shoe Lake power plant to observe one of Oklahoma's last operating steam locomotives. Built in 1945 for the U.S. Army, the Porter 0-6-0 side-tank engine was acquired a few years later by Oklahoma Gas & Electric for switching purposes.

The Chapter's newsletter will be headed by two new editors effective with the September issue. Edwin Birch, Sr. and Jimmy Pattillo will replace Edwin Birch, Jr. The latter has edited a column entitled "Model Railroad Characters I Have Met" in recent issues; included were "Shamokin," a PRR fan who has converted three other fans into PRR devotees; and "Tim Plate," the club politician!

HAWAII

In May, several members of the Chapter participated in an excursion to Maui and a day riding and photographing Hawaii's only operating steam on the Lahaina-Kaanapali & Pacific Railroad. Work is continuing on the restoration of Waialua Sugar Co. No. 6, an 0-4-0T which is being rebuilt at the Lualualei Naval Depot. Among those working on the restoration are Dick Marshall, Nancy and Dave Griner, Brent Hackworth, and John Knaus.

AUGUSTA

At the April meeting, Capt. H. W. George provided a slide and tape program about the Royal State Railways of Thailand. For May, a program of slides was presented by Hal D. Beman, Jr. The June meeting featured three professional railroad movies, **Last of the Giants** and **Inside Track** from the UP and **End of an Era** from Rayonier Corp. July entertainment was provided by George G. Weiss, who showed slides of railroading in Switzerland.

The Chapter has acquired former Georgia Railroad combine No. 160. Built in 1925, the car has a steel underframe, is wood sheathed, and rests on six-wheel trucks. Its last revenue use was on the railroad's mixed trains. The car was donated by Member Ronald L. Jedlicka.

On May 15-16 the Chapter sponsored a booth at the Hobby Fair of the Augusta-Richmond County Library.

A group of Chapter members rode the **Nancy Hanks** on April 24 to Atlanta, a week prior to its removal from service. During June several members toured the mid-panhandle region of Florida, visiting several short-line railroads.

Recent issues of the Chapter's publication **The Cinder Snapper** have featured articles about various short-lines. Included have been the Atlantic & Western, with data compiled by Ronald L. Jedlicka, and the Georgia & Florida.

Brief histories, rosters and other information were included in each article.

CENTRAL FLORIDA

About 45 members and guests of the Chapter traveled aboard a special coach on SCL's **Silver Star** from Sanford to Clearwater and return prior to the Amtrak takeover of this train.

The Chapter is planning to secure a passenger car in which regular meetings may be held. In addition, anyone who wishes to donate historical material about railroading may do so by contacting Arthur T. Poole, president, or the Mount Dora (Fla.) Chamber of Commerce.

EAST CAROLINA

During the past Spring, members assisted with maintenance of rolling stock, and the never-ending battle against weeds, at the museum site.

GULF COAST

George C. Werner provided the entertainment at the May meeting, with a presentation of steam locomotive operation in Central America.

The **Good Cheer** was coupled to the Santa Fe's **Texas Chief** on March 20 for a trip between Houston and Cleburne, Tex. A group of Chapter members were aboard and enjoyed the diner and dome car as well. Upon arrival at Cleburne, the group was conducted on a tour of the AT&SF shop facilities there by the yard superintendent. Return was aboard the **Texas Chief.**

The Chapter has acquired office space in Union Station, and has moved its library materials, displays and equipment into the new office. The SP donated two file cabinets for the storage of material.

IOWA

On May 22 the Chapter sponsored a caboose trip between Eldon and Keokuk, Ia. via the Rock Island, upon what is reputed to be Iowa's oldest branch line. About 35 members and guests were aboard the extra caboose and baggage car of the train. Several stops were made during the 150-mile round-trip journey in order to allow rides aboard the locomotive. During the layover at Keokuk passengers visited the steam towboat **George M. Verity,** which is now a museum.

Following the cessation of electric operations on the Southern Iowa Railway at Centerville, the interurban cars of the Chapter's Iowa Railway Historical Museum were disposed of. Ex-WCF&N No. 100 and ex-CNS&M No. 727 went to the Iowa Terminal at Mason City; former CA&E No. 320 and Southern Iowa streetcar No. 9 were sent to the Midwest Central Railroad at Mt. Pleasant, Ia. for use on a two-mile trolley line now under construction.

Chapter officers for 1971 are Elmer R. Carr, president; James S. Levis, vice president; Marjorie L. Riley, secretary; Wilbur V. St. Peter, treasurer; and Maxon P. Roller, national director.

PACIFIC NORTHWEST

The June "meeting" was held in various parts of Central Oregon as many members gathered at Ed Immel's home in Madras for tours of railfan interest in the area. The first event was a special trip over the line of the City of Prineville Railway on the last remaining mixed train in the Northwest. A get-together on Saturday night was held in the outdoor theater at the Cove State Park and over 300 persons watched the screening of the Buster Keaton classic **The General.** A sudden rain storm cut short the entertainment and the crowd adjourned to the Immel home for the balance of the program. Both attendance and distances covered by members during the meeting set Chapter records! On Sunday, the group motored along the route of the abandoned Des Chutes Railroad and photographed trains on the Oregon Trunk across the river.

Restoration of Stimson Lumber Co. Shay No. 1 proceeded slowly last summer as most of the workers were off in pursuit of active steam throughout the west.

KANSAS CITY

At the April meeting Mr. Dick Mather of Harmon Electronics provided a slide presentation entitled "Grade Crossings Around The World." The program showed the various types of railroad/highway crossing protective systems used throughout much of the world. For May, Edwin C. Jones showed slides of the 1953 NRHS St. Louis Convention, and of the 1960 NRHS Convention in Bristol, Va. James E. Asplund provided the June entertainment in the form of slides of various passenger trains in operation since 1963.

A fantrip was enjoyed by members present on March 28 via the **San Francisco Chief** between Kansas City and La Plata, Mo. On April 24 James Asplund escorted about 35 members and guests of the Central Oklahoma Chapter through various Kansas City railroad facilities.

On August 14 the Chapter conducted a fantrip to the Naional Museum of Transport near St. Louis, and the annual picnic was held August 28 at Loose Park.

PITTSBURGH

James W. McDonnell, manager of freight service and special equipment for the P&LE, discussed the current financial crisis of the railroad industry at the May meeting of the Chapter. Lew Hoy also presented a slide journey through Canada in the days of steam.

The June meeting featured a Union Pacific movie, **Last of the Giants,** a color film of Engine 759 on Horse Shoe Curve furnished by the Penn Central, and slides of steam on the PRR's Middle Division by Lew Hoy. The program on July 1 included highlights of the NRHS directors' meeting in Erie and a review of Cass and Greenbrier Railroad activities in West Virginia May 22-23.

NARRAGANSETT BAY

Oscar Greene presented movies of the New Haven Railroad, the Warwick Railway, and a variety of fan trips throughout New England taken from the 1940's through the 60's, at the April meeting of the Chapter.

TRI-STATE

At the May 13 meeting Member Max Babinger put on a show covering the New Haven Railroad, many of his slides dating back over 20 years. C. G. Muldoon, assistant director of public relations for the Penn Central, was guest speaker at the June 10 meeting. His topic, illustrated by slides, was the Metropolitan Region of PC with emphasis on the measures taken in the past two years to improve service for commuters.

OLD DOMINION

Increasing attendance has been noted at the monthly meetings during the first seven months of 1971. Entertainment for these meetings has included movie and slide programs as provided by members and guests of the Chapter. Domestic programs included a "Short Line Odyssey" by Dr. Arthur F. Peterson, who showed 325 slides of 15 short-line railroads in one hour; a "C&O Night," featuring slides by Lt. Tom Dixon of mountain railroading along the C&O, the **FFV,** and RF&P steam locomotives on loan to C&O during the mid-1950's; a "Nostalgia Night," with slides as presented by Evan D. Siler of the C&O, N&W, NKP 759's visit to Virginia earlier in the year, and the 1970 NRHS Convention; and a program by William R. Stratton which included 759, RDG 2102, Cass Scenic Railroad, and the Fort Eustis operation.

Foreign railroad programs included the "Railroads of Switzerland," by R. A. Whiting; and European rail movies by Carlton N. McKenney, who recently returned from a tour of Europe.

The **Potomac Special,** a combination rail and river cruise from Richmond to Mount Vernon, Va., via the RF&P to Alexandria, Va. and the Wilson Line flagship **George Washington** to Mount Vernon, was operated on May 16. A **Harpers Ferry Special** all-rail trip via the RF&P and B&O Railroads, between Richmond, Va. and Harpers Ferry, W.Va., was operated on July 4.

In addition to the Chapter-sponsored trips, members rode the last run of N&W's **Pocahontas;** special trains on the WM out of Webster Springs, W.Va.; the Fort Eustis Military Railroad on Armed Forces Day; and the Cass Scenic on May 22. Several also attended the annual barbecue in Rocky Mount, N.C., using passenger trains in each direction.

TACOMA

The June meeting of the Chapter featured slides of activities at Railcon '71 in Spokane. The **Train Sheet** for June featured an article by Member Martin Burwash on the naming of Stampede Pass.

PHILADELPHIA

At the May meeting, Miss Susan McElwaine, a groups and tours specialist for Lufthansa Airlines, gave a short talk about a pending railroad tour of Austria and Germany. Following this, a movie of European railroading was shown. In June, Chapter member Robert L. Abrams, who is a special assistant in the Office of Program Operations of UMTA, discussed the government's position with reference to urban transportation both now and in the near future.

On July 16 members and guests enjoyed another dinner trip, an event held annually during the summer months. Those attending rode the Reading Railway's electric line between Philadelphia and Norristown, where dinner was served at the nearby Valley Forge Hotel.

Chapter officers for the 1971-72 years are Joseph Rafferty, president; Samuel L. James, Jr., first vice-president; Larry Eastwood, Jr., second vice-president; Elbert W. Simon, Jr., secretary; Earle P. Finkbiner, treasurer; and James F. Dillon, director.

Cinders, the Chapter's monthly publication, continues to expand and improve. A new format has been introduced for presenting the regular meeting notices, and columns by several members keep the readership abreast of the latest news relating to electric, rapid transit, and mainline railroading.

On July 31, an informal "fan-trip" was conducted aboard trains of the PC from Philadelphia to Baltimore, and thence to Harrisburg via the scenic and single-tracked "Port Road." A visit to the Baltimore Streetcar Museum was also included on the agenda.

HARRISBURG

The May 11 meeting featured a dinner session at the Bonfire Restaurant followed by a business and entertainment gathering featuring slides by Member Howard Walker.

LAKE SHORE

Dave Albrewczynski presented a slide program at the June 19 entertainment program of the Lake Shore Chapter. The July meeting was an informal open slide show by the members.

BLACKHAWK

F. Clayton Snyder presented a program on Climax and Heisler locomotives, GE diesel and electric power, and locomotive stokers at the June 12 meeting.

COLLIS P. HUNTINGTON

After a presentation on the railroad industry's ASTRO program at the May 25 meeting, Larry Fellure presented a slide show on the final trip of N&W's **Pocahontas** behind 759 in steam.

BUFFALO

The May 14 meeting featured a film of rail action in the Canadian Rockies, **Railroaders,** NRHS Film Library slides on the CN, and movies by Jim Van Brocklin of CN steam. In June, the members saw another NRHS slide program, "NRHS Conventions — 1951 to 1965," as well as the Union Pacific film **Last of the Giants.**

POTOMAC

A 1923 movie entitled **Our Hospitality,** starring Buster Keaton, was shown at the May meeting. Concurrent with the film, which featured numerous railroad scenes, was musical accompaniment by Ray Brubacher at the Hammond organ.

A two-part program of both domestic and international railroading highlighted the June meeting. On the domestic scene, Wayne Sherwin showed color slides of locomotives in operation 18 years ago, including pioneer diesels of the Texas-Mexican Railway and Baldwin-built units on the PRR.

Harry P. Dodge, Sr. followed with an international program. Included were movies and slides of diesel, electric, steam and trolley operations in East Germany. Although regulations for photography within **Iron Curtain** countries are still strict, Mr. Dodge was able to obtain his movies and photographs by joining a group of British railfans who were visiting this area.

The site of the National Capital Trolley Museum at Wheaton, Md. was the location of the July meeting. Members and guests were afforded rides aboard ex-Washington car 766 and a Dusseldorf, Germany tram, No. 955. After the riding and photography were completed, a program of railroad movies was shown in the auditorium of the museum's visitor center.

In the June issue of the Chapter's newsletter, Mrs. John Hilton describes her experiences as the wife of a railfan. Written in a humorous vein, the article touches on the author's first encounter with the word "railfan", as well as an account of happenings on fan-oriented trips to Lancaster and Reading, Pa. In the July issue, Thomas L. Underwood lists all railroads, past and present, operating in the State of Maryland.

HAWK MOUNTAIN

The Chapter's annual picnic was held at the Laurel Run Railroad, Temple, Pa., on June 26. Movies by John Scharle were shown in the evening.

MOHAWK & HUDSON

The May meeting at the Shaker Inn featured a program of railroading in the Swiss Alps by Dave Johnson. It was a thorough coverage of routes, operations, and equipment illustrated by some 200 slides.

Between 60 and 70 members spent June 19 riding the new Cooperstown & Charlotte Valley Railroad with exclusive use of the diner and an ex-Elgin, Joliet & Eastern observation car.

NORTH JERSEY

Officers elected at the June 4 meeting include Harold Goldsmith, president; G. Lester Whitfield, vice president; Frank S. Miklos, secretary; Edward T. Francis, treasurer; Albert L. Creamer, national director; and Allison Lievre, sergeant-at-arms. Entertainment consisted of films from the Crittenden collection shown by Steve Maguire.

CHAMPLAIN VALLEY

The May meeting was held at the Vermont Educational TV Station and featured a video tape on the former West River Railroad as well as a rail quiz by Bud Spaulding. The June 9 meeting was held on the ferry **Ticonderoga** at Shelburne Museum with movies of the Rutland, D&H, and B&M by Charles Ballard.

HEART OF DIXIE

The April meeting featured a slide program from the NRHS Film Library, including steam locomotives of the CB&Q, C&IM, C&NW, C&S, D&RGW, IC and UP. The May meeting was composed of a three-part program: James A. Britain played a tape recording of the last run of the **City of Miami**, including an interview with the last passengers to board and leave the train at Jasper, Ala., as well as the train conductor himself. Following, James T. Singleton, Jr. showed movies of the recent Chapter excursion to Akron, Ala. In conclusion, Harry M. Breed, Jr. showed a film of the 1970 NRHS Charleston Convention.

For June, a color film produced by the National Park Service to commemorate the Centennial of the Golden Spike in 1969 was shown. The film **Painted Canyon** was featured for the July meeting.

Claude Blitchington has succeeded Donald W. Christie as program chairman, effective in June.

On March 27, in cooperation with the Southern Railway, the Chapter sponsored a steam-powered excursion between Birmingham and Akron. On the going portion of the journey, the special 16-car train was headed by steam locomotives 722 of the Southern, and 750 of the Atlanta Chapter. After dropping five cars at Akron, the train was wyed for the return to Birmingham, headed by No. 750. Over 500 passengers enjoyed the excursion; it had been sold out in advance of the trip date.

The Chapter again held "open house" at its museum site during Transportation Week in May. Steam locomotive 4046 was used to pull the Seaboard caboose on shuttle trips in the Frisco yard. It is planned to steam up this former Alabama By-Products 0-6-0 once a month during the summer.

LEHIGH VALLEY

At the February meeting Ted Collins presented a program of movies about narrow gauge steam railroads in the United States. Featured were the two-foot Bridgton and Harrison in Maine, Mt. Washington Cog Railway, Tennessee & Western, D&RG, EBT, and others. As an added feature, Erich Quimbly projected his film which was awarded honorable mention in the Kodak Teen Contest of 1970. Scenes of the Metroliner, Reading operations in the Bethlehem area, WK&S and Quakertown & Eastern steam were shown. Appropriate sound, including rock music, accompanied the movies.

For March, Harry Schnieber provided a selection of slides which included electric, steam and diesel views. Many of his slides showed the human side of railroading as well as scenery and special subjects, with appropriate commentary.

The annual banquet was held April 24 at the Kempton Community Center near the WK&S line. About 100 persons enjoyed a beef and ham dinner, with Gerhard Salomon acting as toastmaster. Entertainment was provided by Gerald H. Landau who showed movies of trolley and rapid transit operations from Boston to the midwest during the past decade.

The May meeting featured a two-part program by Ronald DeGraw, a Chapter member who is also associated with SEPTA. The first part consisted of slides depicting Philadelphia Suburban Transportation Company's growth from a plank turnpike to a modern electric railway system, while part two consisted of movies of current SEPTA (Red Arrow Division) operations, as well as operations of the LVT Liberty Bell route in 1951.

A trolley tour of routes of the Toronto Transit Commission was held on July 11, using PCC cars purchased from U.S. systems.

During the first nine months of 1971, many members assisted with plans for the NRHS national convention, held in Bethlehem over the Labor Day weekend.

Charles W. Houser, Chapter member and **Bulletin** circulation manager, has recovered from a recent heart attack and is once again active in railfan and organization activities.

PROMONTORY

Dave England presented a slide program on Utah interurbans and electrics at the July meeting. In May, Glenn Lords presented an excellent selection of movies of Provo Canyon Railroad No. 618, the Chapter's Saltair fantrip, and his tour of Italy and Germany. Chapter members have been working hard to prepare the Provo Canyon tourist line (nicknamed the "Heber Creeper") for its initial public operation in July.

ARIZONA

The May meeting was held at the Statesman's Club instead of the usual spot at Echols Junction. The program consisted of a Japanese National Railways film called **On the Move** and a film by Westinghouse called **Expo Express** describing the latest ideas on rapid transit.

NORTH ALABAMA

Meetings of the Muscle Shoals Division have featured movies by James L. Sims of the Chapter's May 15-16 steam excursion between Sheffield and Huntsville, Ala. Both of these trips were headed by ex-Mississippian locomotive No. 77, owned by the Chapter, and both were sold out. Titled **The Charlie Smith Special,** the trains operated via Southern Railway, and ample time was allowed at Huntsville for touring the Alabama Space and Rocket Center.

Entertainment for meetings of the Redstone Division has been varied. In March, George F. McCanless, Jr. presented a program entitled "General Sherman and the Railroads." For June, Tom Kinser gave a slide presentation about railroading in the Cumberland country of Tennessee. At the July meeting, both Craig Faulkner and James Sims showed movies of the May steam excursion.

On Saturday, August 28 the annual picnic for all Chapter members was held at the Sheffield depot. The museum was opened for this event so that members could inspect the exhibits at their leisure.

At the fifth annual meeting of the Chapter, held last winter, Hugh J. Dudley received the award as the "Most Valuable Member." William J. Purdie, Jr., master mechanic-steam for the Southern Railway, gave a talk centering around steam excursion operations. This was a timely subject in view of the Chapter's first excursions to be run a few months later.

The Chapter newsletter has been named **The North Alabama Toot.**

OLD SMOKY

Meetings during late spring and summer included slides of trolleys and interurban railways operating primarily within the northeastern United States, by Robert Scanlon; a film entitled **Last Run of the Shay**, produced by the St. Regis Paper Co.; slides of the CSS&SB, Clinchfield, and Amtrak trains at Nashville, by Gordon Baer; an exhibit of first-day Amtrak covers, by Henry T. Hodges; and slides of ACL, N&W, and Southern.

WINSTON-SALEM

At the July meeting, a two-part program was provided. First, a slide presentation of General Electric locomotives from 1880 to 1968 was shown. Following was a 16mm movie about short-line railroads of the South, taken between 1953-1957 and including much steam locomotive action. For August, slides of NRHS conventions and steam-operated excursion trains from the NRHS Film Library were shown. In addition, slides of recent excursions were also displayed to members and guests.

Work on the Chapter's coach and baggage car at Whitaker Park is continuing, with special attention to sealing the roofs of each car prior to movement to the Southern Railway for painting.

TENNESSEE VALLEY

On November 18, 1970 the Tennessee Valley Railroad Museum was dedicated. On September 12, 1971 the eight-track museum site was opened to the public. Many pieces of rail equipment are on display, including a converted baggage car which houses many items of historical interest.

An automated telegraph unit has been donated to the museum by W. E. Lindemann. This set will provide the sounds of instruments once heard in many railroad depots around the nation. Purpose of the exhibit is also to honor the inventor of the telegraph, Samuel F. B. Morse, as well as its countless operators over the years. Visitors will be able to tap out their own messages.

MIAMI

At the April meeting, Dr. Stanley Glass showed slides of European electric lines, including those in The Hague, Cologne, Bonn, the Ruhr cities, Amsterdam and Rotterdam. In addition, movies of several U.S. electric properties were shown. For May, C. Leslie Andrews presented a slide program about station and related architecture, as found in Florida and other areas.

Several members made the circle trip from Miami to Naples and return on April 24. Purpose of the journey was to ride SCL's "doodlebug" run between Naples and Lakeland, which was discontinued with the advent of Amtrak.

COLORADO MIDLAND

The third in a series of lectures on Colorado railroad history being presented by the Chapter was "The Royal Gorge War" by Harold Seely. Harold's talk covered the period from 1878 to 1880, and in addition to the Gorge War he covered the expansion of the line from Canon City to Leadville and the development of branches to Westcliffe, Calumet and Dillon.

The second part of the series had been presented by Lester Williams at the April meeting and was entitled "The Drive Toward El Paso." The series will continue throughout the year in commemoration of the D&RGW's centennial.

WASHINGTON

The Chapter is now meeting regularly in the National Museum of History and Technology Building of the Smithsonian Institution, located in downtown Washington.

Gen. Frank S. Besson Jr., one of the eight incorporators of the National Railroad Passenger Corp., was the guest speaker at the February meeting. Gen. Besson outlined the tasks facing NRPC and its various consultants, including American Airlines which is advising on food service and ticket procedures.

The Annual Slide Contest was held at the March meeting. Five categories of entry (diesel, electric, foreign, general and steam) were allowed. Top winners in each subject category included Frank Scheer, Robert C. Spragg, Carl M. Franz, Ronald H. Deiter, David S. Levine, Robert R. Bitzer, Henry S. Libby, Adron F. Hall, Joe N. Adkins and Bronette S. Ehrlich. At the June meeting, a tour behind the scenes of the Chapter's meeting place was conducted.

The Chapter's publication, **The Timetable,** is now enhanced by a new letter head featuring a Metroliner photograph. In addition, a new column entitled "Member of the Month" has been introduced, with H. Glenn Cunningham, Ronald H. Deiter and Chapter President Robert R. Bitzer having been included in the spring issues.

Two successful fan trips between Washington and Harpers Ferry, W.Va. were operated on April 24 and July 17, the April trip having been sold out one month in advance. Budd RDC cars of the B&O were used on both trips. This year marks the 20th anniversary of the Chapter's first railroad excursion, with 51 trips run to date.

ALASKA-YUKON

Among activities sponsored by the Chapter were a flea market held the weekend of May 14-16 to raise funds for Chapter projects and museum. The end of May found several adventuresome members traveling to Yakutat to observe the noted fish-carrying Yakutat Southern Railroad. YS No. 3, a rare Lima 2-6-2, has been donated to the Chapter, but oh those transportation problems caused by hundreds of miles of water! On July 4 a number of members rode the Alaska Railroad's annual excursion to Seward.

WISCONSIN

The Chapter marked its 21st year on April 30 with a banquet at the Flaming Pit Restaurant. The featured speaker was V. Allan Vaughn, NRHS vice president-public relations, who presented a slide program about the steamboat **Delta Queen.** A movie from the Milwaukee Zoo was also shown. Master of ceremonies was Jonathan Green of WTMJ.

CENTRAL NEW YORK

The Chapter held its annual open house in commemoration of Martisco Station's 101st anniversary, with an estimated 500 in attendance. Recent programs of the Chapter have featured Canadian steam by Al Kallfelz and Frank Klock on May 19 and a slide program of railroads in Oswego County by Dick Palmer on June 16.

(Please turn to Page 54)

MAINLINES

RAILWAY NEWS IN REVIEW

AMTRAK — At mid-summer, as well as we could detect, AMTRAK had become virtually a "silent partner" in the railroad passenger business. At least, it was making little audible noise about itself. The established trains were running, but you'd never know it unless you asked. (A new nationwide timetable was issued July 12, showing the reinstated Buffalo-Chicago service, the New York-to-Boston run via Springfield, and the Minneapolis to Spokane tri-weekly, plus assorted schedule changes to improve connections.)

One of the surprisingly "milk toast" features of the AMTRAK reign is its lack of any real control over how the railroads run the passenger trains. The AMTRAK contract contains no specific penalty clauses for late or sloppy passenger train operation. The pertinent clause reads only that "Railroads shall provide services . . . in an economic and efficient manner, and shall give appropriate recognition to the importance of on-time passenger train operations and passenger comfort and convenience. Railroads shall make every reasonable effort to maintain the schedules established by NRPC." Now if only the passengers could have some say as to what's "reasonable"!

On the plus side, there was a new bill in Congress to give AMTRAK 90 million more dollars specifically to buy new passenger trains able to run at high speeds on existing roadbeds. Hopefully, this could be enough for thirty 240-passenger trains, and that these would put an end to the need for "endless operating subsidies" — but nobody had yet said where you go to buy trains like that.

AMTRAK ROUTE CRITERIA — In these days of sophisticated systems management and probabilistic decision analysis, it comes as no surprise to learn that the 16 original basic AMTRAK routes were picked on the basis of certain logically selected criteria — apparently without too much regard for the politics of the situation. The routes chosen had to pass eight specific tests, of which the foremost was "probable profitability". The others were:

- — Total transportation needs.
- — Service demands on each route.
- — Cost of service on each route.
- — Adaptability of the routes to a total national rail network.
- — Population area served.
- — Flexibility of management by AMTRAK.
- — Extent of capital improvements required.

We can just imagine the computers whirring over all those, especially the one about AMTRAK's management flexibility.

AUTO-TRAIN — In a previous column we reported ICC go-ahead to the new Auto-Train Corporation to raise money for its proposed rail passenger service between Washington and Jacksonville, where the passengers' cars were carried on the same train. A stock offering is now being made, and considerably more details are available on the proposed service. For example, ATC expects to run two trains, one leaving each city at 7:00 p.m. and arriving at the other at 9:00 a.m. the next morning. Each train will have two diesel-electric locomotives (to be bought new from General Electric), thirteen enclosed bi-level auto carriers, and five domed passenger cars. The latter are expected to be picked up from the Santa Fe, with the auto carriers from the Canadian National. Passengers will ride in the dome cars, not in their automobiles, and there will be movies, food and beverages, and a free midnight buffet. (Hopefully, some time will be set aside for sleeping.) Proposed fare is $190 one way, covering both the automobile and all its passengers. This is not an awful lot more than it would take to drive four people, counting motels and meals, and promises to be a good deal more convenient. One interesting aspect is that this service will be outside the scope of AMTRAK. Auto-Train will be a private enterprise, contracting with the RF&P and the Seaboard Coast Line for operation of the trains. If everything goes as hoped, it could even start operating before the end of 1971.

TRANSPO/72 — The pressure is building up under that International Transportation Exposition that the DOT is planning for next May at the Dulles International Airport. Secretary Volpe has been appointing bigwigs to advisory committees for it, and in July officially adopted a new name — "Transpo/72". Said Volpe, "'Transpo/72' conveys in a single word what the U.S. International Transportation Exposition is all about — transportation — the moving of people and goods, safely, swiftly, economically, and with due regard for our environment and the quality of life."

Mr. Volpe is determined to have something new and spectacular to show at it. Now that Congress squelched his plan for a 150-mph tracked air cushion rapid transit system running to the airport, he is pushing to demonstrate several different "new and innovative" PRT (Personal Rapid Transit) systems. Contracts were awarded July 21 for four different demonstration systems:

- — Dashaveyor Company for a 31-passenger, rubber-tired vehicle, electrically propelled, with a guideway switch.
- — Ford Motor Company for a smaller 24-passenger system with an on-board switch.
- — Transportation Technology, Inc., for a PRT system with air pad suspension and linear induction motor propulsion.
- — Varo Corporation for a suspended monorail PRT system using on-board switches activated by the guideway.

If you don't understand what we're talking about, plan to go to the Exposition and see for yourself — we're just quoting from the news release.

Actually, the idea is quite simple, sound, and straight-forward, and no longer particularly new. PRT's are sometimes these days referred to as "people-movers", and are generally conceived as small vehicles operating automatically on some sort of track, or "guideway". The station stops would be on "sidings" so that an individual PRT car could be programmed to bypass all but the one or two stations selected by the riders in that particular car. You get in the car, push the button for where you want to go, and it takes you there. Something like an automatic elevator. (Indeed, they are sometimes referred to as "horizontal elevators".) The result, hopefully, is a personalized trip from origin to destination comparable to the personal journey of a private auto user. Obviously, the fewer persons to a car, and the more cars, the more effective this would be. Personally, we don't feel that 24 or 31-passenger vehicles ought to qualify for the "people-mover" name in most situations, but then of course economics has to enter here, too. At any rate, the thought is that some such system will be the hope for urban transportation in the ever more crowded central cities of the future.

KC UNION STATION — The big Union Station in Kansas City was the center of attention for real estate developers last July when plans were announced by the Kansas City Terminal Railway to tear it down in favor of a complex of high-rise apartments and office buildings. Lots of people thought there should be a way to preserve the 56-year old structure, which still ranks as the third largest rail passenger station in the country, even if it's not as fully utilized as it used to be. The feeling was shared by the City Landmarks Commission, which pointed out that the Kansas City Union Station is a "national landmark representing one of the finest examples of monumental transportation architecture in the world". A week later, the papers carried the description of an alternative plan for a convention center and motels in the area around the station, but preserving the station building itself as a mid-city transportation center. The latter plan seemed to have the endorsement of everyone concerned, so maybe that's the way it will turn out.

SPRINGTIME ON THE PENN CENTRAL — June was a bit balmier on the Penn Central this year than most previous months have been — financially that is. With a net loss of only $1.8 million, it came closer to breaking even than any month since the bankruptcy. In June of 1970, the corresponding figure was $43 million in the red. Its cash position also improved by nearly $25 million more than forecast for June, though trustees were quick to point out that this was equal to little more than two days' gross receipts.

Equally encouraging was a substantial reduction in operating ratio (expenses divided by revenues). For some time, PC's operating ratio has been up in the 90 percent range, one of the higher ones in the industry, whereas the real moneymakers are running more often in the 60's and 70's. In June, PC's ratio dropped to 79.16, which is pretty respectable. This has not come easily, and has no doubt meant the jobs of a lot of people, but it could mean the assurance of worth-while, continuing jobs for a great many more.

BN's BUSINESS — Burlington Northern got a good two-page write-up in **Business Week** last summer, primarily comparing the results of its merger with the Penn Central's. We quote an interesting comparison: "One . . . advantage that the BN enjoyed in its merger was that its component roads were in much better physical shape, and were vastly more profitable than those of the Pennsy or the New York Central. Furthermore, the BN is a much easier railroad to run. The Penn Central can be compared to a huge freight classification yard spread around the industrial heart of the U.S., with all the attendant high costs and confusion of switching cars in and out of trains and in and out of sidings. The BN, by way of contrast, can assemble through trains in Chicago for the Pacific Northwest, and touch them only once. Except for inspections, they race over long stretches of empty prairie. And this, in the railroad business, is where the efficiencies and profits are."

PLAUDITS TO THE MTA — The Sunday New York **Times** for July 11 carried a 32-page magazine supplement all about New York's Metropolitan Transportation Authority, and we must say it was just about the best, most interesting, most readable and most informative bit of literature of that type that we have ever seen. All about the plans for new subways, people-movers, and up-grading of rail commuter facilities in the New York area, with maps, photos, cartoons, entertaining articles and appropriate advertisements. Also covered were bus, bridge and airport operations, but the emphasis was on rail facilities. A superb example of the publicists' art at its best, and highly recommended for a bird's-eye view of what's going on there.

CANADIAN NATIONAL BOWED — The Canadian National Railway has been making valiant efforts for some time to show that properly run rail passenger service can be profitable, but apparently without success. After heavy investment in upgrading its Toronto-Montreal run, including its trouble-prone set of Turboliners, CN was reportedly ready to apply for Government subsidy of its losses. The subsidy, if forthcoming, would permit "an even better train service between the two cities", according to Company officials. The Turboliner's mechanical problems are supposed to have been pretty well corrected, but their cost of operation was reported as still keeping them out of service.

MORE ABOUT CN — Elsewhere on the Canadian National, an $8.5 million program has been announced for up-grading its passenger cars over the next two years. More than 1000 cars will undergo heavy shopping or accelerated maintenance. Cars being heavy shopped will get new upholstery, carpeting, draperies, and bright new interior color schemes. Also, all of the air conditioning units will be overhauled.

In the freight car arena, CN is reported testing a new depressed center flat car capable of carrying six 20-foot containers. If these were put end-to-end, it would mean a car over 120 feet long, which would be really big, but this one will be a still-extra-large 89 feet. The depressed center is the clue. It will enable them to stack one container on top another in the center section, with two in tandem, for a total of four. The other two are carried over the trucks at each end.

CP LOCOS — At the same time, the other railroad in Canada has ordered 24 new 3000 hp diesel-electric locomotives from General Motors of Canada, at a cost of some $10 million. They are destined for the Canadian Pacific's pool of high horsepower locomotives in western Canada unit-coal-train service, with delivery early in 1972.

PC LOCOS — Penn Central also announced plans last summer to acquire 50 new 1500 hp diesel-electric locomotives for local freight and switching service. On the Penn Central, "acquire" means that they will lease them, provided the Government approves. The plan is to lease them from a Chicago firm called Xtra, Inc., which will buy them from EMD. Delivery will start next March, and the lease will run for 20 years. PC is also "acquiring" 7,492 new freight cars in 1971 through similar leasing arrangements.

THE COAL PILE — On June 25, the Norfolk & Western broke its own all-time record for numbers of cars of coal loaded at mines that it serves. 7,538 hoppers were filled on that day, representing some

377,000 tons — a clear indication that there's plenty of fire left in the coal industry yet.

JERSEY CENTRAL EXPERIMENT — While the railroad industry and the United Transportation Union were scrapping over contracts and work rules last summer, management and labor on the bankrupt Jersey Central got together in an experiment to scrap work rules and operating procedures on both sides. Recognizing the dire plight of their railroad and the imminent possibility of its folding altogether, both management and union leadership began collaborating in a series of task forces to evaluate each other's ideas to see if they could save the railroad. The Jersey Central is small enough that the effect of changes should be quickly observable. Hence the experiment is being watched closely by the entire industry, management and labor alike, to see if it will provide some proof of their respective views. Of course, no one believes this is the whole answer to the Jersey Central's problems, which stem primarily from the drying up of coal traffic in the New York area. Nevertheless, it could help tremendously in generating new traffic, and at the very least is a most refreshing example of management and labor cooperating to save both their jobs. Would that there were more of it in every industry.

WELDED RAILS — This is a Historical Society, so listen to some history. You think welded rails are a recent invention? 'Taint so. Way back in 1894, the **Scientific American** noted that " . . . electric street car companies have shown a disposition to adopt welded (rail) joints, not only to secure a continuity of track for mechanical reasons, but for electrical ones also . . . The (welding) operation is so perfect that after the welding is done and the ground is filled to its level, it is almost impossible to tell where the weld has been completed".

But admittedly, welded-at-the-site streetcar rails are a far cry from modern mainline welded rails. In the forefront of the modern technology is the Louisville & Nashville, which has recently put into operation a completely automated and computerized rail welding facility in Nashville. Equipped to handle either new or second-hand rail, this set-up automatically selects the rails, tests them for kinks, bends and internal defects, straightens them, crops and cleans the ends as needed, and moves them through the welding station with a minimum of manual handling and attention. Continuous lengths up to 1440 feet long are produced and automatically loaded onto the rail train for transportation to the point of use. L&N aims at converting all its 6000 miles of primary and secondary main line to welded rail, either new or second-hand, over the next dozen years. A detailed description of its new welding facility can be found in **Railway Age** for July 12, 1971.

FORTUNE'S WHEEL — The editors of **Fortune** magazine devoted their July 1971 issue to "The U.S. Transportation System and How To Make It Work". With customary expertise, they have produced a clear, comprehensive, and we think unbiased summary of the nation's transportation business as a whole, and what afflicts it. Its lead article propounds the thesis that there is in effect an overabundance of transportation facilities, with resulting waste and inefficiency. "Government regulation of the freight business has resulted in excessive rates, in rails and trucks operating at only 50% of capacity, and in extortion by organized labor." On the passenger side, "the private car has become the cheapest way to travel (as well as the most convenient) partly because, in a time of rapidly rising wages in public transportation, the car owner does his own driving."

Other articles describe the success of the new automated Lindenwold rail rapid transit line in luring commuters out of their cars in the congested Philadelphia area; the implications of the Interstate Highway system; and typical operations in trucking and ocean shipping. Also there's a portfolio of color photos on river transportation on the mighty Mississippi.

If there is an overall conclusion that is drawn, it is that the regulatory system as it exists today is outmoded, does more harm than good, and has got to go. Another dispassionate conclusion is that buses are a better way to go than rail rapid transit for most city commuter problems (lower investment, greater flexibility, and so forth).

As if to support that contention, the Department of Transportation in Washington put out a news release in July explaining how the impact of the two-day rail strike by railway signalmen had been lessened for New Jersey commuters by extra buses. Some 250 additional buses each morning zoomed through the Lincoln Tunnel's exclusive bus lane, accommodating nearly 15,000 commuters who normally took the train. And apparently with no strain.

GREAT TRAIN ROBBERY — Penn Central has gotten its purloined box cars back from the La Salle & Bureau County, with no real explanation as to how they happened to get there in the first place. In the meantime, model railroaders will be pleased to note that they can now paint their models of PC box cars true to prototype. We understand one of the suppliers has come out with HO decals of the LS&BC herald.

MEMBERSHIP EMBLEMS

Official NRHS membership buttons, tie clasps, decals, and cloth emblems available. Buttons and tie clasps are finished in an attractive combination of gold and green. Cloth emblems are washable and non-shrinkable, can be sewed on jackets, caps, etc. Decals suitable for either inside or outside of windows.

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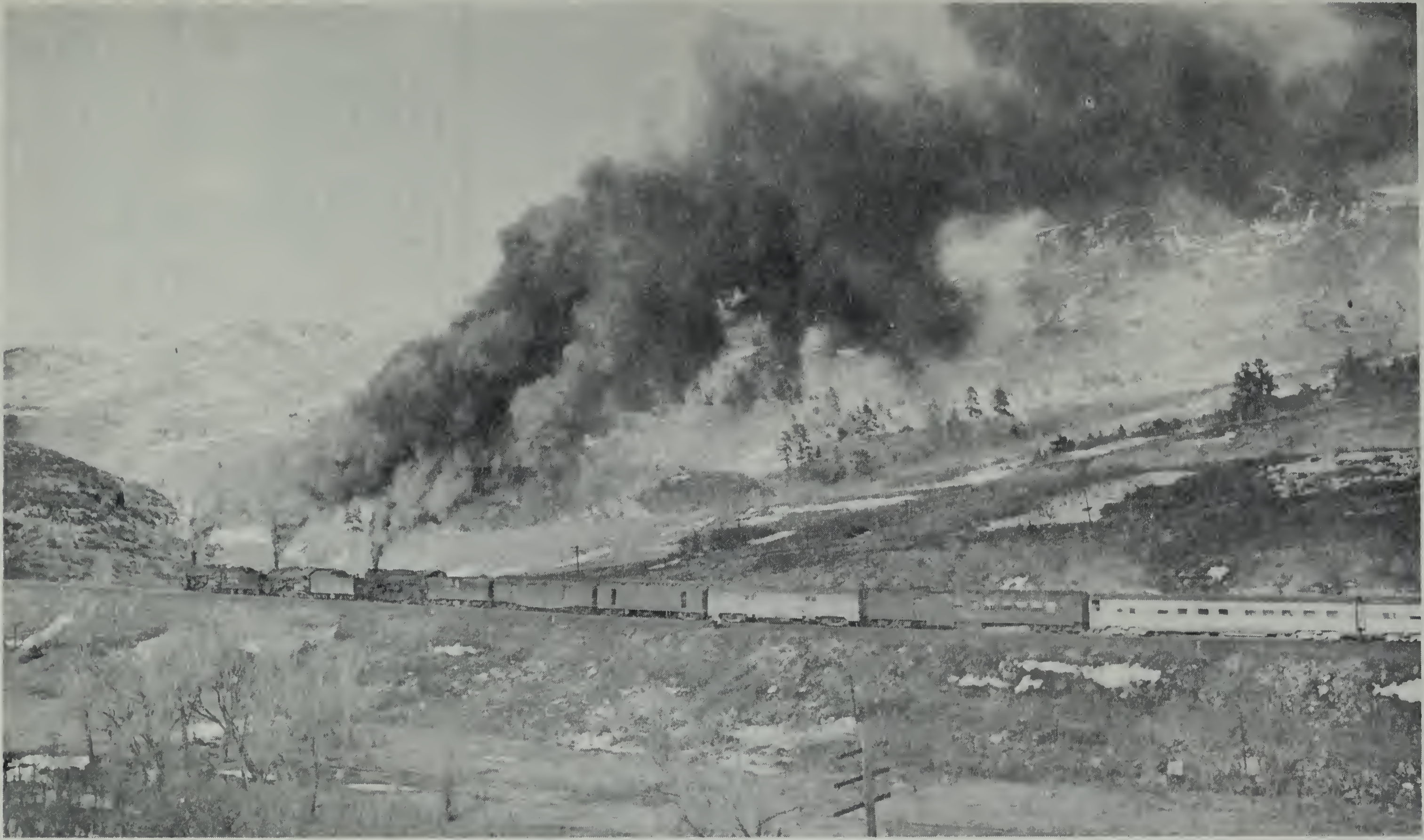

Santa Fe Railway

Raton Pass possessed a high power requirement. Here, a very large 4-8-4 and a pair of 2-10-2's triple-head the *Chief* up the 3.41% grade toward Raton's 7,487-foot crest.